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CATALOGUE

OF THE

ELEVENTH ANNUAL EXHIBITION OF INVENTIONS.

BEING A COLLECTION OF ARTICLES RECENTLY INVENTED, PATENTED, OR REGISTERED, EXHIBITED AT THE SOCIETY OF ARTS, ADELPHI, DURING THE SPRING OF 1859.

N.B.—The Council wish it to be understood that they are not responsible for any of the statements contained in this Catalogue.

ENGINEERING, MINING, RAILWAY MECHANISM, &c.

(*For the remainder of the Articles in this Section, see Drawings.*)

1. Patent Coal Burning Locomotive Boiler; Peter Brotherhood, Railway Works, Chippenham.

This invention consists in the interposition, between the fire-box or furnace and the ordinary flues or tubes, of a combustion chamber, of a cylindrical or other form, connected to the fire box by one or more tubes surrounded by water. Between the fire box and combustion chamber, there is an air chamber, surrounded by water, having an opening for the admission of atmospheric air, and communicating with the combustion chamber through a number of small tubes, by which means the atmospheric air is brought into contact with the flame and gas entering the combustion chamber, and effects the combustion of the inflammable gases. In order to ensure a more perfect mixture of air with gas, a disc of fire-clay (or other suitable material) is placed at a short distance from the air tubes in the combustion chamber; on striking against this disc, the flame and inflammable gases are spread over the whole surface of the air tubes, thereby ensuring the perfect combustion of the gas, preventing the appearance of smoke, increasing the heat, and economising the fuel. The air tubes may also be introduced into the fire-box from the air chamber, so that when all the smoke is evolved and there is a clear fire, and the air is no longer required, the damper being shut, the air tubes are converted into effective heating surfaces.

2. Patent Improvements in the Adaptation of the Furnaces or Fire Boxes of Locomotive Engines for Burning Coal so as to Consume their own Smoke; Henry Ashton, Birkenhead.

This invention consists of an iron hood or deflecting plate fixed inside the fire box, and hinged over the doorway, inclined downwards and towards the middle of the fire box, in order to deflect the air entering by the doorway downwards amongst the gases or smoke; it can be regulated to any inclination according to the variation of the fuel in the fire box. The fire door is also hinged from the bottom, and provided with two side plates, to prevent the ingress of any air except from the top, and is retained in its position, by the rack or sector, to any degree of opening, to regulate the admission of the air. The aid of a jet of steam in the smoke box is required when the engine is standing and the blast off.

3. Patent Steam Boiler; Robert Armstrong, North Woolwich, S.E.

This boiler contains two generators, the smallest number that can be advantageously used in any case. This particular form of generator is called the "double taper shape." Instead of both ends of the generator forming equal frustums of similar cones, sometimes one end only may be conical while the other portion is nearly or quite parallel, forming what may be called the "single taper" or "trumpet shape." Such a trumpet-shaped tube or generator may sometimes be used within the upper part of a fire-box or in a furnace flue of small diameter, where the latter passes through the steam chamber, when used for the purpose of superheating and drying the steam where it may not be required to act as a stay. But in the middle of the fire-box itself the double taper-shaped generators are preferred to be exclusively used, for their greater strength and superior steam-generating qualities, and also because, when crossed at right angles, the greatest number can be got into a given height of boiler, or the same collective area of steam-generating surfaces can be brought nearer to the fire. The mode of fixing the steam generators to the fire-box by means of angle-iron rings, either riveted or otherwise, by which they are made to project into the water space and thereby enabled to carry the escaping steam from the ends of the generators away from the vertical sides of the fire-box, consequently preventing any injurious repulsion therefrom, is also equally applicable and advantageous to single taper-shaped as well as parallel tubes, when such tubes are placed horizontally in the fire-boxes or furnace chambers of boilers. (See *Engineer*, Feb. 18, 1859.)

4. Picking's Patent Boiler Feeder; Thos. P. Purssglove, 1, Sussex-terrace, Battersea-fields, S.W.

This apparatus is intended to be fixed near to, and a little above, the boiler to be supplied. It consists of a strong iron vessel, which is made to communicate with the upper and lower parts of the boiler by means of two pipes, one of which supplies the feeder with steam, while the other conveys the water from the feeder to the boiler. There is also another pipe, which leads from the water supply, and through which the water rushes into the feeder. Each of these pipes is furnished with a valve for opening and closing it; that in the boiler supply-pipe is self-acting, but those in the steam and cold water pipes are actuated by an arrangement of floats inside the vessel. When working, and the vessel has just been filled from the water source, the steam is turned on by means of the floats, and the water is allowed to fall by its own gravity into the boiler, and the moment it is empty these floats shut off the steam and open the cold-water valves; this causes the steam in the vessel to be condensed, when it is again filled with water.

5. Duncan and Gwynne's Patent Spiral Heat Diffusers; Gwynne and Co., Engineers, Essex-street Wharves, W.C.

These twisted plates of metal, when introduced into the tubes of steam boilers, produce a change or circulation of the heated products of combustion in their passage through the tubes, and arrest a large measure of heat, transmit it to the water, and convert into working steam that equivalent which, without these appliances, even in the very best boilers, would escape through the flues and be lost. Their application does not require any alteration in the boilers at present in use, and they can be fitted in a few hours. Marine and other boilers supplied with the heat diffusers will be less corroded internally than boilers in which a large portion of the heat passes away in the smoke.

6. Patent Woollen Felt for Covering Steam Boilers and Steam Engines; Jeremiah and Peter Garnett, Wharfside, Otley.

This felt is composed entirely of waste woollen refuse from paper mills, which is converted into a coarse pulp in the ordinary rag engine for paper-making. It is put upon the steam boiler in a wet or pulp state, and matted together by beating with a piece of flat wood; when dry it becomes one solid piece, and is an excellent non-conductor of heat, as upon a boiler working 50 or 60 tons pressure, it is stated that candles may be laid for weeks without melting. It may at any time be taken off and replaced by steeping in hot water until again softened.

7. Patent Improved Marine Engine; J. A. Limbert, Engineer, R.N., H.M. Ship Cæsar.

The object of the arrangement of this engine is to economise the space occupied by the engine. The drawing (See No. 380) illustrates the comparative space occupied by engines of similar power in H.M. ships Cæsar and Princess Royal, as compared with those on this principle, by which it appears that the economy amounts to nearly one-third.

8. Patent Economic Smoke-Consuming Boiler; Price and Dawes, Cleveland Works, Wolverhampton, and 24, St. Swithin's-lane, London, E.C.

This boiler is cylindrical in form, with a main longitudinal tube from end to end, having a number of oblique taper tubes placed within the lower half of the circumference of the shell or body of the boiler and the main longitudinal tube, into which they open and convey the hot air, &c., from the fires, the whole of it passing direct to the damper-flue and chimney, thus dispensing with horizontal return flues. (See drawing, No. 377.)

9. Patent Safety Apparatus; Price and Dawes.

This is made to act upon the ordinary safety valve, to let off the steam, and prevent explosions from deficiency of water, and also to indicate the height of the water, and whistle to call attention to high and low water.

10. Patent Governor for Marine and other Steam-Engines; Price and Dawes.

This consists of a ring of metal hinged upon a revolving shaft, and placed within the current of steam passing to the engine; being also so arranged that by its centrifugal power acting in opposition to a spring, the speed regulates the area of the opening and the allowance of steam to the engine. Instead of about 30 points of bearing, as in the ordinary governor and throttle-valve, this governor has but five, three of which only are called into action on opening or closing .(See drawing No. 385.)

11. Patent Adjustable Expansive Gear; Price and Dawes.

In this gear the closing of the steam is effected by either knuckle-joint or catcher actions, actuated by adjustable stops or cams, by hand, or by the ordinary governor, as the case may require. With this gear the engine can be handled with the same facility as those having no expansive movement. (See drawing No. 386.)

12. Patent Rolling Lever; Price and Dawes.

This lever has a travelling fulcrum for opening or lifting valves, and the rolling action of the lever gives great power at the commencement of the action, or when the full pressure is upon the valve. When used for steam engines with double gears neither equilibrium valves nor check-straps are required.

13. Patent Steam Pressure Gauge; (Taylor, Son, and Nelson); Dean, Travis, and Co., 8, Market-place, Manchester.

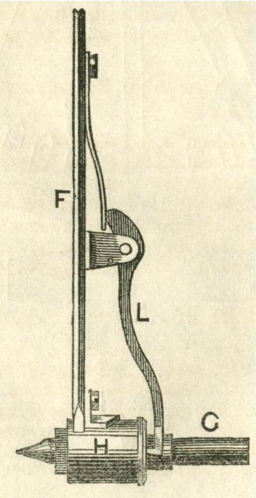
The principle of this gauge is "weight against pressure." Its action is as follows:—To the front of the boiler is screwed one end of a syphon, to the other end of which is attached the gauge; the syphon is filled with water, which is, by the pressure of the steam, forced against a vulcanised india-rubber diaphragm, upon which rests a spindle with cross-head acting as a lever to two weights, which, when the spindle is forced upwards by the pressure of steam, are gradually elevated on each side, thereby causing the hand to indicate upon the dial the amount of pressure in the boiler.

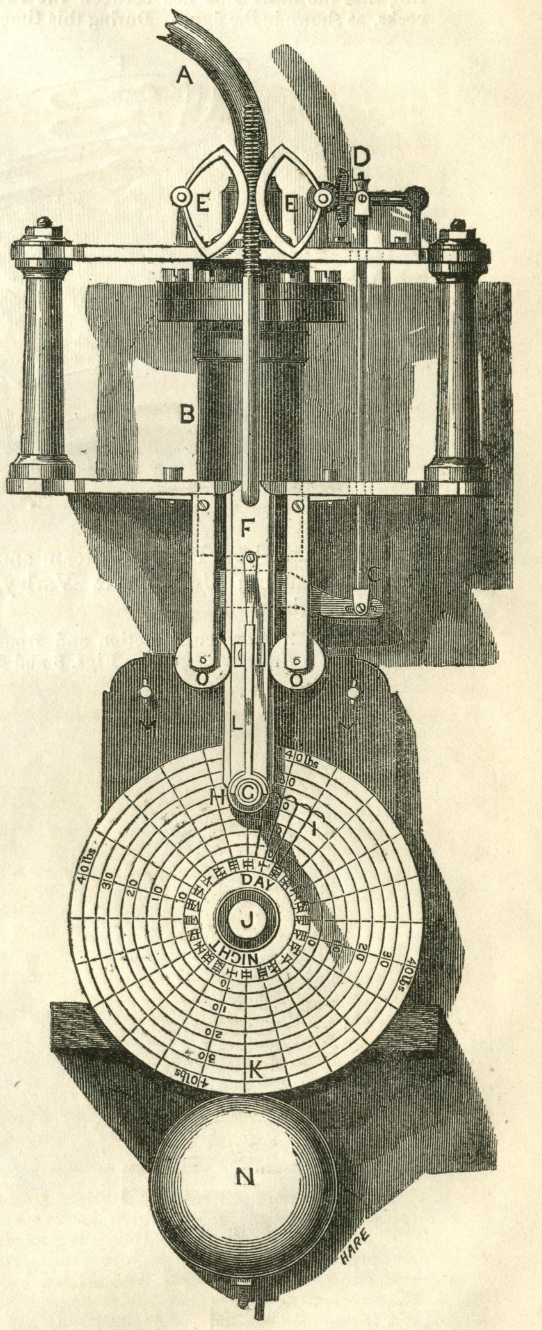
14. Patent Combined and Deposit Water Gauge; William Chesney, Willenhall.

This gauge is fixed on an upright filter, of a sufficient length to prevent any deposit that may be formed from choking the guage. The deposit may be run off from below. This gauge is therefore especially intended for boilers where muddy water is used.

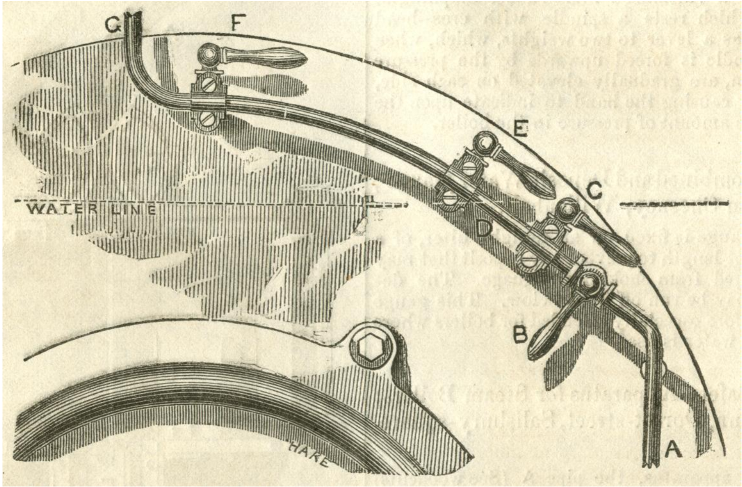
15. Patent Safety Apparatus for Steam Boilers; W. Mann, Dorset-street, Salisbury-square. E.C.

In this apparatus, the pipe A (See woodcuts) admits steam to a spring piston in the cylinder B, which descends in proportion to the pressure of the steam in the boiler; the arm C is fixed to the end of the piston-rod, and is carried downward with it; the segmental rack D, being connected to the arm C by a rod, also follows the downward motion; the rack D gears in a pinion, on whose arbor is fixed one of the quadrant heads E E, and which, from the nature of the arrangement, will have an upward motion; hence, as the pressure of the steam increases, the pencil in the pencil bar F, will be drawn up to one of the circular lines of pressure on the diagram paper or card K, by the rack working between the two quadrant heads E E, the left-hand one acting only as a guide. G is the pencil, which can be removed in a moment, if required, by simply throwing up the lever L, in which condition it will remain until the pencil is replaced. The eight-day clock, M M, carries round once in twenty-four hours a metal disc, to which is fixed, by the thumb-screw J, the paper or card disc K, having thereon circles corresponding to the steam pressure from zero to 40 lbs. (or higher if required), and radial lines equal to the twenty-four hours of the day. N, pendulum; O O, guide wheels. Suppose the stoker wishes to ascertain if the cock E blows steam, and C water, both of which were left closed;





he first shuts the pressure cock F, which up to this time has been left open, and opens the abutment cock B; the pressure then contained in the pipe from the abutment to the spring piston will be immediately relieved by the steam rushing out at A; he then opens C, and finds water flow at A; on opening E steam is found to flow at A, as water did before, indicating that the water line lies between the two cocks, as shown in the figure. During this time, which need not be longer than usual, the spring will have returned the piston to its normal position, and the pencil have fallen to zero, leaving a mark that exactly corresponds to the time the cocks were opened; the man has then simply to shut B and open F, the pipe is again refilled with steam equal in pressure to that in the boiler, the piston descends a distance equal thereto, and the pencil returns to the circular line of pressure as before.



16. Patent High and Low Pressure Steam and Vacuum Gauges; Johnson & Varley, Peterborough.

Figs. 1 and 2 show cross section and front elevation of low pressure gauge. Figs. 3 and 4 show cross section and front elevation of high pressure gauge. These gauges have a peculiar construction and arrangement of spring pressure disc or plate, which communicates motion through levers, rods, or otherwise, to the pointer used for indicating the pressure or

FIG. 1.

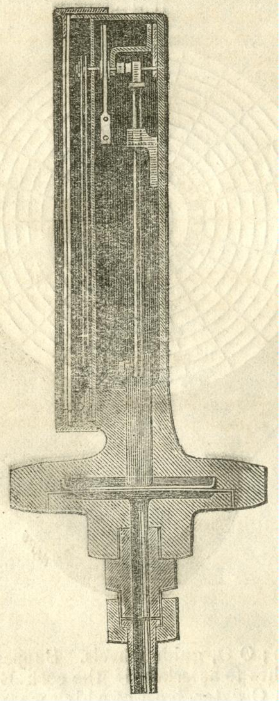
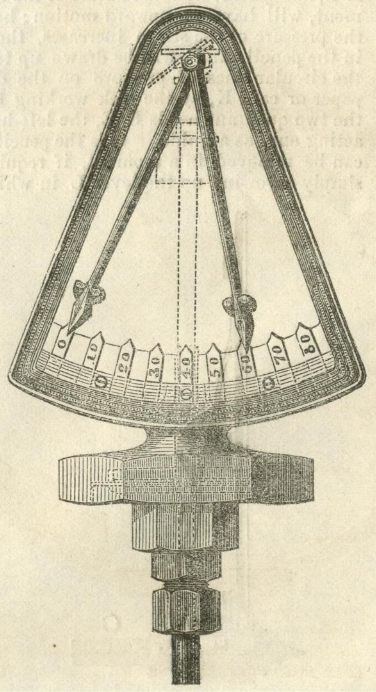


FIG. 2.



vacuum. They differ from other gauges in the peculiar form of disc employed, which, not being tied or fastened at the edge, is perfectly free in its action, thus avoiding liability to fracture. The pressure is transmitted from the back of the disc to the rim or flange from which it springs, the greatest amount of deflection being given out at the centre without injury to the plate, which, from its construction, can be made much stronger than those ordinarily employed. The arrangement of dial with moveable figures obviates the necessity of at any time renewing either the one or the other. This arrangement is applicable to existing gauges, and will enable a new spring to be applied without incurring the expense of a new dial. Both high and low pressure gauges may be made in the circular form, as in figs. 3 & 4. An additional pointer is used in the low pressure gauges, for showing the maximum attained.—(See *Mechanics' Magazine* for January 28, 1859.)

FIG. 3.

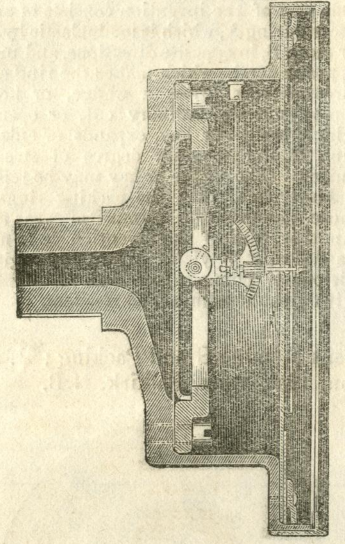
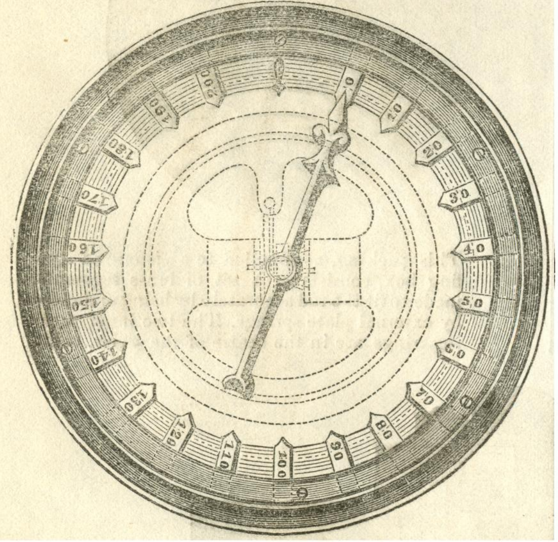


FIG. 4.



17. Evans' Electro Alarum Gauge; G. C. Trewby, Gas Works, Brentford, S.W.

This apparatus consists of an inner and outer cylinder, which communicate with each other at the bottom, the areas of the cylinders being equal, and representing two legs of a syphon. In the inner cylinder is a float, with a rod running through its centre. On the upper part of this rod are fixed two discs, one on the upper, and the other on the under side of the cover of the cylinder, which cover is insulated by means of a ring of wood. A wire connects one extremity of a galvanic battery to the cylinder, the other extremity of the battery being connected to one side of the alarum, the cover of the cylinder being connected with the opposite side. The gauge is about half filled with water; and, a communication being made between it and the inlet-pipe of the exhauster, the apparatus is in action. By this arrangement the float rises or falls, according to the pressure in the hydraulic main, and thus brings the points of platina in contact with one or other of the electrical communications, by which the bell of the alarum is thrown into action, and continues to ring until the pressure in the hydraulic main is altered.—(See *Journal of Gas Lighting*, Oct. 14th, 1856.)

18. Haste's Patent Valve for the prevention of Boiler Explosions; Bray, Waddington and Co., New Dock Works, Leeds.

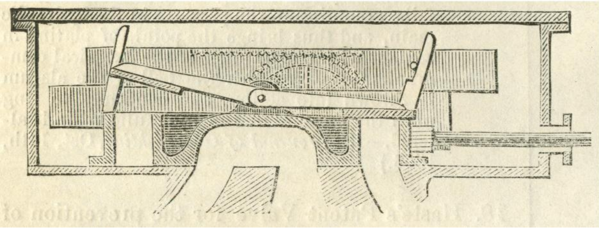
This invention consists of a double cylinder fixed upon the boiler in the ordinary manner. One of the cylinders contains a balance weight resting upon a valve seat, the area of which can be adjusted to any pressure of steam required. The other cylinder, which is connected by a steam-way, contains a piston acting upon an inverted double-seated cylindrical valve, open at both ends, so that the steam may pass freely through, forming two separate openings for the escape of steam from the boiler. The said valve is also attached to a float by a lever. Hence, should the water in the boiler be reduced, by evaporation or otherwise, to a point determined upon, the valve will be opened. Should the steam be raised a fraction of a pound above the determined pressure, the valve is immediately acted upon and opened by the rising of the balace weight. When fixed to the boiler, no person can interfere with its action.

19. Patent Improved Steam and Fire Regulator; Robert Griffiths, 69, Mornington-road, N.W.

This Fire and Steam Regulator is stated to to so readily adjusted that the variation in the pressure of steam need not exceed two pounds per square inch, or the variation may be ten pounds if desired.

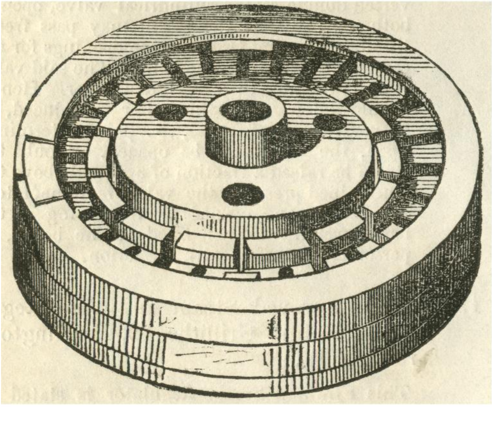
20. Patent Alterative Expansion Slide Valve; Joseph Hall, Derby.

This slide valve is of the ordinary construction, with the addition of a steam port at each end, which ports are covered by flap valves lying on the top and mounted one at each end of a lever, which vibrates on a central fulcrum attached to the back of the valve, and is kept in position by means of a spring. These flap valves are each furnished with a friction roller, which is acted on by a fixed cam placed at each end of the throw of the slide valve. As the flap valves are raised, they are held by retaining levers (acted upon by a spring) until the return of the slide valve brings these levers alternately against one or other of two stop pieces attached to slides. The valve lever is thus released, and the cam at the other end brings the valve down and shuts off the steam. This can be done at any part of the stroke, as the slides which carry the stops are moveable, and so connected by a pinion and racks as to be capable of being moved nearer to or further from each other. A lever attached to this pinion is connected to the governor of the engine in such a way that as the speed of the engine varies, the stops are moved nearer to or further from each other, and thus the amount of steam allowed to enter the cylinder is regulated.

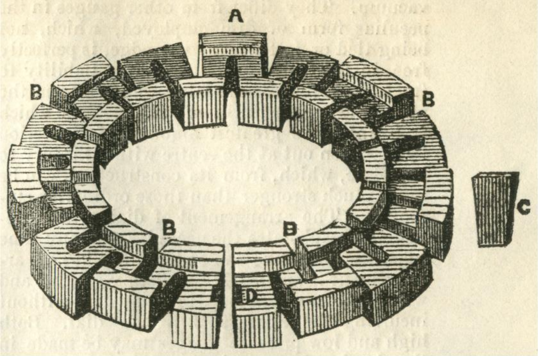


21. Patent Vulcanized India Rubber Valves; North British Rubber Company, Castle Mills, Edinburgh.

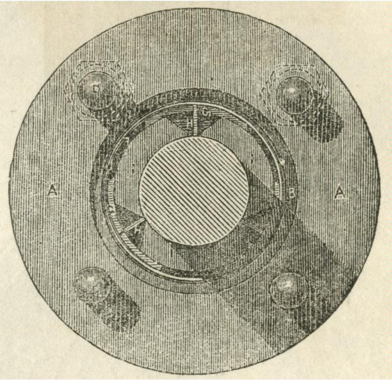
22. Patent Metallic Spring Pistons and Plungers; W. Parkin and Co., Bridge Foundry, Attercliff, near Sheffield.



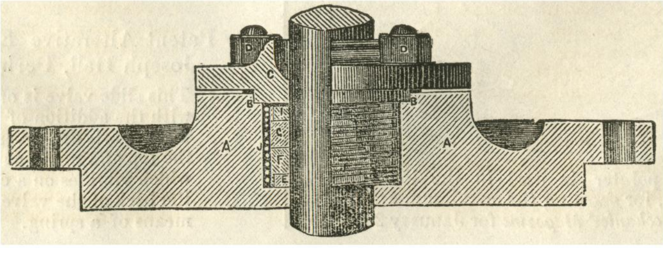
They are so constructed and arranged that they are rendered perfectly steam, air, or water-tight, by means of metallic packing; and will resist a pressure of 500lbs. to the square inch. One part of the invention consists of an elastic pressure ring A, which is made elastic by indents, or slots, B, in opposite directions, and more than opposite depth, which makes the ring spring in circumference, when a wedge, or key, C, is forced into the ordinary cut, or opening, D, which wedge, or key, expands or enlarges the ring to the necessary degree of strength required. The wedge or key may be replaced by a larger one, when the packing rings require more expansion on account of wear and tear. Another part of the invention is to make the elastic ring to yield up and down, giving the piston, or plunger, increased facility to work with great steadiness and freedom.



23. Patent Metallic Gland Packing; R. Anderson, Blackbraes, Falkirk, N.B.



This packing, as supplied to a piston-rod stuffing box, consists of a set of brass segments, made to fit the rod accurately by being embraced by external plate springs. The two inner packing rings are in the centre of the series, being



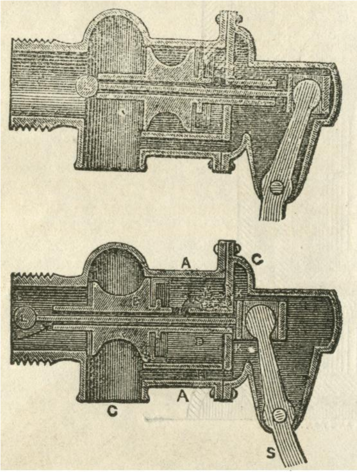
each preferably formed in four distinct parts, the ends of the segments being so shaped as that each shall have the same bearing on the piston-rod after being worn as at first. This metallic packing is equally applicable to the packing of pistons, and may be used in other cases where fluid tightness is required.

24. Improved Taps and Valves; John Warner and Sons, 8, Crescent, Cripplegate, E.C.

25. Hinks's Patent Self-cleansing Filter Tap; Samuel Sheppard, Birmingham.

This tap has two water-ways, one communicating directly with the cistern, and the other having a filtering medium in it, so as to filter the water as it is drawn off.

26. Patent Hydrostatic Ball Valve; George Jennings, Holland-street, Blackfriars, S.



The valve of this cock is closed, not by the action of the ball, as is usual, but by the hydrostatic force of the water, which accumulates in the chamber when the ball rises, the area of the chamber being superior to the valve face.

27. Patent Feed-cistern for Boilers; George Jennings.

In this model the cock and ball are fixed in a glass vessel to illustrate the action.

28. Patent Water-waste Preventor, applicable for Domestic and Sanitary Purposes; George Jennings.

This apparatus is intended to obviate the necessity for cisterns, high-pressure cocks, valves, and other appliances which have been invented to meet the requirements of a constant supply at high pressure. It may also be used for public fountains and for domestic purposes. The model shows the diaphragm, and the mode of supplying and discharging the contents.

29. Patent Gun Metal solid bottom Stop and Bib-cocks, with Stuffing-box tops, &c., for Steam, Gas, or Water; George Jennings.

30. Patent fullway India rubber tube stop-cocks with Union Joints; George Jennings.

31. Patent Iron Taps; W. Jas. Payne, 119, Waterloo-road, S.

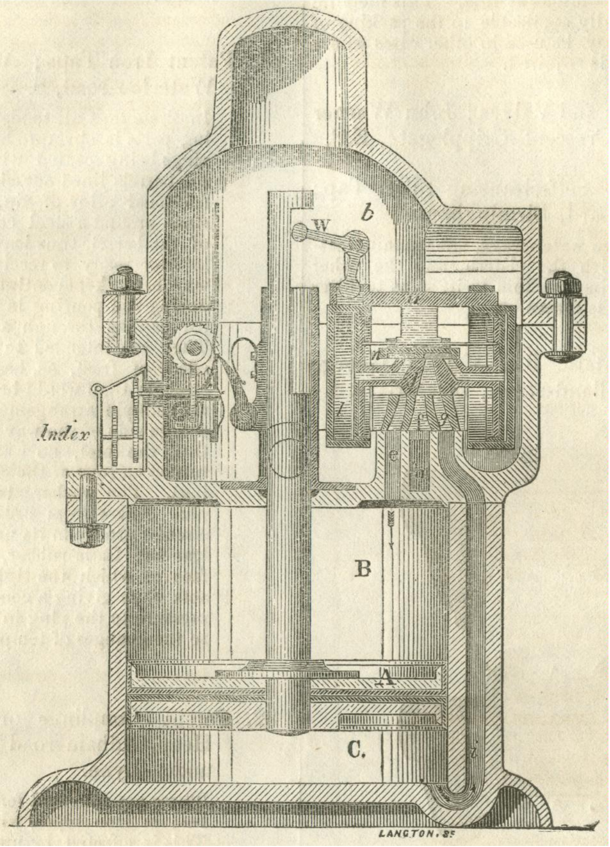
In these taps all tendency to rust in the working parts is obviated by the conical part of the plugs being coated with pure gun-metal, and the barrels lined one-eighth thick with an anti-frictional alloy of tin, poured in the molten state around a steel core, placed in the centre of the barrel, thus leaving a perfectly smooth interior ready to receive the plug; the water-way being kept continuous through the barrel during the pouring in of the alloy, by a steel bar passing through a slit in the steel core. They are intended to withstand the bursting effect of frost, as, besides being made much stronger than would be practicable in brass, by the simple arrangement of making the discharge side of the way through the plug wider than the inlet, no water is left within when turned off (one of the chief causes of taps bursting). The washer also at the bottom of the plug differs from ordinary ones, in having a circular groove in its under side filled with vulcanized India-rubber, against the elastic surface of which the tightening nut underneath acts, thus giving a constant and self-regulating pressure to the plug in the barrel conformable to the changes of temperature.

32. Patent Couplings or Pipe Unions; W. Heap, Oldham-road Tool Works, Ashton-under-Lyne.

These are intended for instantaneously joining lead or iron pipes, without the use of solder. This is effected by means of a double screw.

33. Chadwick and Frost's Patent High-Pressure Piston Water Meters; Bryan Donkin and Co., Bermondsey, S.E., and Herbert Frost and Co., Manchester.

The advantages of this meter are stated to be: 1st. It is of less bulk and weight. 2nd. It never requires lubricating, as all the parts work in water. 3rd. It is not liable to be tampered with, and the valve cannot be fixed so as to let the water escape without being registered. In the annexed section, the meter is shown working. The water is entering the upper chamber of the meter *b*, and is passing down *e*, into the measuring cylinder B; the pressure of the water being exerted in forcing the piston A to the bottom of the cylinder; the water is being expelled out of the lower part of the cylinder C, up *i* and *g*, down *f*, and out at *h*. On the completion of the stroke of the piston, the projecting end of the piston rod carries with it the catch W, which moves the top slide valve *u*, and allows the water to escape from the small cylinder or cup *l*, and admits it into the opposite cylinder or cup, whereby the fluid pressure is exerted directly against the end of the main valve *j*, and changes its position, and thus reverses the action of the meter instantaneously, and without any noise or concussion. Each stroke of the piston is communicated to the index, and the exact quantity of water discharged is duly registered.



34. Patent Bored and Polished Glass Cylinder Pump; J. Chedgey, The Grove, Southwark, S.E.

35. Patent Safety Cage for Miners; Barnes and Loach, 348, Summer-lane, Birmingham.

The principle of this invention is that the weight of the cage acts upon levers which come in contact with the sides of the shaft, and support the cage in case the rope breaks.

36. Patent Safety Lamp; Alfred Sterry. Swansea.

In this lamp the globular form of the wire ensures coolness and steady supply of air to the flames, and direct egress for the light in all directions equally. The turned wire prevents rust, which ordinarily so much diminishes the apertures. The double-cap (the only part which is destructible in use) can be renewed at pleasure, being held in place by a screw. The oil supply being at the side, and the flame on the top of a steep cone, very little light is lost below by the shadow of the lamp. The lamp can be locked in the ordinary way. The burner is supplied on the fountain principle, which ensures a constant supply of oil to the lint of the flame; hence charred wick and smoke are much diminished. With colza-oil, the lamp should burn six hours without snuffing. The oil supply is equal to 18 hours.

37. Patent Safety Lamp; Wilkins and Co., 24 and 25, Long Acre, W.C.

In this lamp the flame is surrounded completely with glass or talc. The gauze, which in the Davy lamp is continued from the level of the wick upwards, obscuring the light, commences here some 3 inches higher. The draught is maintained by the external air passing through the body of the oil-can by means of four large tubes around the wick, communicating with a lower chamber in connection with the external air through the meshes of a fine metal gauze. Two kinds of these lamps are now being manufactured—one intended to be used in situations where the existence of explosive gases may be remedied as soon as discovered, as in sewers, gas-works, &c.; and the other in mines and situations where workmen are obliged to work continually in an atmosphere highly charged with explosive gas.—See *Mining Journal*, December 11, 1858.

38. Patent Wheels and Gearing for Carriages propelled by Steam; James Braby and Son, Newington, Southwark, S.E.

This invention consists of an annular railway or drum, having on its inner circumference a conical rail. The driving-wheel works within the inner circumference, having a corresponding groove to the rail in the large wheel. Gearing is introduced to give different velocities in travelling, and a crank communicates with the connecting-rod of the engine. This model shows the application of the above principle to railway locomotives for ascending steep gradients.

39. This model shows the above invention applied to Carriages propelled by Horse Power; James Braby and Son.

40. Proust's Patent Hydro Syphoid Axle Box, lubricated by a combination of grease, oil, and water; John Braithwaite, M. Inst. C.E., 18, Great George-street, Westminster, S.W.

The construction of the axle box is, in all particulars, the same as the ordinary axle box, with the exception that it is surrounded on three sides by a cistern of water, which is charged through a valve, and hermetically closed, the only communication with the grease box being by means of a syphon, the longer leg extending through the bottom of the cistern or reservoir, which, being hermetically closed, prevents the operation of the syphon by atmospheric pressure in the usual way, which acts only in the event of any heating of the axle occurring, so as to cause the expansion of the water and air within the reservoir, forcing a few drops of water through the syphon, which, mixing with the molten grease, forms a saponaceous lather, acting immediately on the exposed portion of the axle, cooling it, and lubricating the bearing effectually, cooling the axle box, and thereby reducing the temperature of the water in the reservoir, so that the supply through the syphon ceases. The axle box is supplied in the usual way with grease or oil when it requires it; and the supply of water is through the valve, which must be opened occasionally, and the reservoir filled up. The economy of grease upon this system is stated to be 75 per cent.; the traction being diminished in direct proportion to the reduction of friction. The axle box exhibited has been running 18 months, and is in the same condition as when taken off the waggon on the Paris, Orleans, Tours, and Bordeaux Railway, being stated to have performed 34,788 miles without any additional supply to that which was supplied in the first instance, the remains being that which is now exhibited on the axle box. The axle box and brasses were second-hand when started, and have not been repaired since.

41. Patent System of Axle Boxes, not requiring Lubricating; Alphonse de Brussaut, 14, Surrey-street, Strand, W.C.

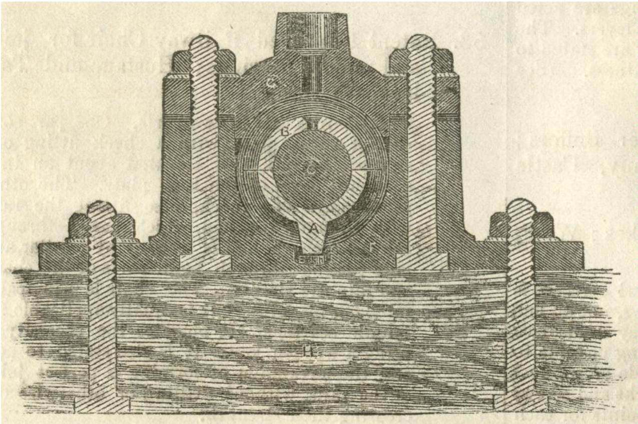
This apparatus consists of a series of four, six, eight, or any other convenient number of cylindrical rollers, of the length of the journal, retained at certain distances apart from each other, yet still united by elastic bands of vulcanised india-rubber. These rollers, thus united, and placed around the journal, are set in motion by the pressure of the axle, without the possibility of collision with, or friction against each other, or of rubbing upon the surface of the journal, or of the bearing, thus avoiding as much as possible any friction, or opposition to the motion of the journal. The action of rolling being thus substituted for sliding, there cannot be any abrasion of the substances, and lubrication is stated to be unnecessary.

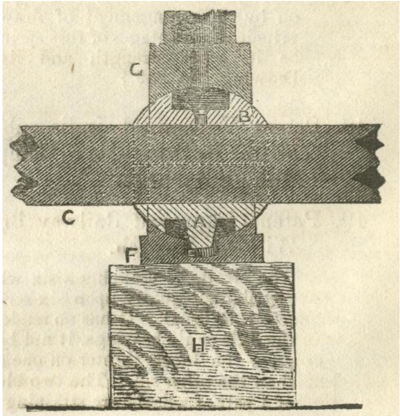
42. Patent Cast-iron Naves for Axles; James Braby and Son, Newington, Southwark, S.E.

The peculiarity of these naves and axles consists in the arrangement of the caps and reservoirs for holding the oil.

43. Patent Self-adjusting Spherical Bearings; Wallis and Haslam, North Hants Iron Foundry, Basingstoke.

This bearing forms a ball-and-socket joint, which adjusts itself to the direction of the spindle, passing through it, thereby doing away with the liability to heat or wear crosswise. The seat or block and cap are turned internally, so that when put together their interior surfaces form a spherical cavity, in which the brasses, which are turned externally to the





form of a sphere of the same diameter as the cavity, work freely in any direction. They are prevented from rotating with the spindle by a nipple on the lower brass, which fits loosely into a socket in the bottom of the block, but which allows sufficient motion for the bearing to adjust itself to any variation in the position of the shaft. They can be applied to railway carriage axles, as they will allow the wheel to rise or fall with the inequalities of the rail without at all affecting the bearing. The bearing has a channel cast round the exterior of the brasses, in order to lighten them, but this does not affect the working of the ball-and-socket joint.

44. Patent Railway Coupling, with Spring Catch; Walter Hall, 10, Pier-road, Erith, S.E.

The object of this arrangement is to prevent the coupling from unscrewing when in use; it is intended to be used with Hall's Patent Brake Apparatus. (See No. 50.)

45. Patent Universal Joint Couplings, as used with Patent Railway Brake Apparatus; Walter Hall.

This coupling has two centre pins, which pass through the hollow centre piece, so that when either of them is removed, the joint becomes detached. This hollow centre piece is a coupling to the apparatus, whenever the same is fixed to any part of the train, provided the universal joints are all of the same principle in the construction. (See No. 50.)

46. Patent Shackle; John Oxley, 7, St. Augustine's-road, Camden-square, N.W.

By this invention the body of a carriage is, as it were, insulated from the under-carriage, in which latter part the jar and rattle is generated. A cylinder of vulcanized India-rubber, or other suitable material, is inserted between the two parts of a shackle suitably constructed to receive it.

47. Patent Buffer and Draw Spring; William Wright & Co., Sheffield.

This is composed of a series of curved plates, with their faces arranged alternately in opposite directions, moveable on a metallic rod passing through their centre. The springs are acted on by an arrangement of draw levers. The principal advantages of this spring are stated to be its great strength and lightness. (See Drawing, No. 389.)

48. Patent Vulcanized India-rubber Buffers; North British-rubber Company, Castle Mills, Edinburgh.

49. Patent Improved Railway Brakes; W. P. Wilkins, Ipswich.

The strain of brakeing a six-wheel carriage is distributed equally upon six screws, not on one screw, as usual. It has no tendency to displace the axle or its bearings, it not being possible to press the block tighter on one side of a wheel than the other side. The two blocks and screws of a pair of wheels are straining points for each other, neither pressing the wheel until the other approaches and presses equally. By one handle it can be applied to all the wheels upon a carriage, or several carriages in the same train.

50. Patent Apparatus for Working Railway Brakes; Walter Hall, 10, Pier-road, Erith, S.E.

This apparatus consists of a square bar, suspended under each carriage, the connection being made by a universal joint coupling, so as to render the brake continuous throughout the train, thus making it possible to apply three or four brakes simultaneously. In making up a train, the brake-blocks of the brake-vans are screwed up close to the rims of the wheels, and then the coupling is effected so as to avoid the possibility of slack. The brake-blocks are so arranged on the carriages that two operate in each direction, so that the carriages may be moved either backwards or forwards, indiscriminately; but this is not the case with those attached to the tenders and the brake-van. There is a worm-wheel on the spindle of the handle from the van, working into a cog-wheel, loose on the longitudinal shaft. On this shaft there is a screw working in a loose collar, to which are attached the ends of one pair of levers, working the arm of a lever, on a fixed shaft, also carrying the levers to which the blocks are attached.—(See Minutes of the Institution of Civil Engineers, 23rd Nov., 1858; *Mechanics' Magazine*, 24th April, 1858; The *Engineer*, 10th Dec., 1858.)

51. Patent Permanent Way; Christopher Hill, Chippenham.

The rail is supported on longitudinal iron sleepers, which break joint alternately, and are bolted through the rail. They are made of either plain or corrugated plates.—(See drawing, No. 393.)

52. Patent Permanent Way; Christopher Hill.

In this arrangement the longitudinal sleepers, which break joint, are tubular, and enclose the lower portion of the rail. They are formed of two quadrants, with flanges bolted on to a semi-circular plate, also with flanges; the upper flanges of the quadrants being bolted through the rail.—(See drawing, No. 393.)

53. Patent Improved Railway Chair for joint and middle bearings; Hostage and Tatlock, Chester.

This chair is cast in two parts. One part consists of a base plate, with a cheek fitting one side of the rail, and elevated about an inch above the level of the base plate. The other part consists of a cheek, (also fitting the rail) with a tongue attached, which passes through the other cheek, and is secured by a collar and pins passing through both parts of the chair, and into the sleeper. The chair is principally intended for joints, but is equally applicable for middle bearings. It obviates the necessity of using a wooden key. It is also stated to possess the advantage of forming a perfect joint of the rails, without drilling or otherwise decreasing their strength.

54. Ashcroft's Patent Cushion Chair; Permanent Way Company, Great George-street, Westminster, S.W.

The jaws of this chair are slightly inclined, and have grooves running down them, so as to key on to wooden blocks or cushions which hold the rail in its position.

55. Improved Railway Chair; Jas. T. Relph, Bexley Heath, S.E.

In this chair the key is wedge-shaped, and is secured in position by a small iron pin passing through it at the side of the chair.

56. Plate and Channel Iron Permanent Way; J. W. Cruickshank, Cook-street, Chippenham.

This invention consists of a plate iron bed, 11 inches wide by ½ inch thick, parted at the joint on curves, and upon these plates are fang-bolted the bearers, economically cut out of channel iron, with one saw-cut only to each bearer. On these bearers the rails are fang-bolted, making the permanent way complete. The plate girder transoms are made with ¼in. plate iron, bolted to bearers which are opposite to each other. The accompanying model shows part of a girder bearer and rail-joint. (See drawing, No. 394.)

57. Patent Cup-trough Sleepers; James Samuel, 26, Great George-street, S.W.

These sleepers are of the form of an inverted cup, and have openings in their sides to facilitate packing. The rails are laid in a hollow at the top, on wooden bearings. (See drawing, No. 392.)

58. Patent Combined Iron and Timber Tramway Rail; J. C. Brant, 18, Surrey-square, Old Kent-road, S.E.

This rail may be used with the argillaceous sleeper, forming a continuous rail, the timber breaking all joints. Less iron is thus required.

59. Patent Consolidated Argillaceous Railway sleeper, with or without the ordinary Chair; J. C. Brant.

This sleeeper is not liable to decay, and is stated to be capable of sustaining any amount of heavy traffic. The surface bearing being large, constant packing is dispensed with. There is a cork cushion let into the sleeper, for the chair and rail, giving considerable elasticity.

60. Whitworth and Gibson's Patent Improved Compensator and Releasing Railway Signal; B. Vickers, Atlas Works, Sheffield.

61. Rigid Suspension Bridge for railway or ordinary traffic; R. M. Ordish, 18, Great George-street, Westminster, S.W.

This method of constructing bridges of large spans, includes ordinary curved suspension chains or wire cables, in combination with straight inclined chains, for supporting the platform and moving loads, the curved chains being employed solely to sustain the dead weight of the inclined chains by means of vertical rods, thereby retaining them in straight lines; and the inclined chains to support the whole weight of the platform and loads, which are suspended from the intersections of these chains which are not subject to alteration of form or disturbance of equilibrium by unequally distributed or moving loads, all tensile or compressile strains in the platform being avoided.

62. Kenney's Patent Balance Rolling Bridge; Turner and Gibson, Hammersmth Iron Works, Dublin.

This bridge is constructed with two longitudinal beams of iron or wood, with joists and flooring balanced and travelling on two rollers, and raised, opened, and shut by two others, requiring only one and a continuous motion from the time of starting until either opened or shut. It requires no intricate or expensive stonework.

63. Patent Fore Carriage; J. Oxley, 7, St. Augustine's-road, Camden-square, N.W.

This apparatus consists of a combination of a revolving motion with a transverse sliding motion, which causes the wheels to describe an ellipse in turning from the ordinary position due to a straight draught into any other position or angle, up to that of being at right angles with the hind or following wheels.

64. Patent Hinges for Carriage Doors; John Oxley.

This invention consists in forming a metal socket or cap for the bottom knuckle of the hinge, between the under side of which socket or cap and the top face of the bottom knuckle is inserted an elastic washer of vulcanized india rubber. As the upper end of the metal socket or cap is necessarily of larger diameter than the bottom knuckle, advantage is taken to increase the diameter of the face of the knuckle working above and upon it to the same size. By the introduction of the elastic washer, the injurious effects of vibration are prevented.

65. Patent Covering for Carriage Springs, composed of Caoutchouc or Gutta Percha; James Braby and Son, 32, Newington Causeway, S.E.

66. Patent Carriage Drag; James Braby and Son.

This invention consists of a jointed bar, with an arm at right angles, which grasps the tire of the wheel below the centre of the axletree, and effectually stops its revolution.

67. Patent Improved Truck or Solid Block Wheels for Gun and other carriages; James Braby and Son.

The object of this invention is to give perfect equality of bearing surface.

68. Patent Arrangement for fixing Carriage Windows; John Oxley, 7, St. Augustine's road, Camden-square, N.W.

This consists in the adaptation of a stud and slot, to fix the window when closed, and prevent rattle.

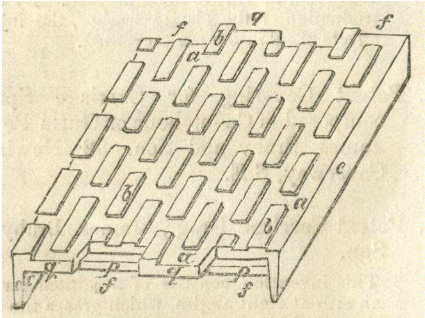
69. Patent Indestructible Wheel for Streets, common Roads, and for Agricultural Purposes; B. Samuelson, Banbury, and 76, Cannon-street West, E.C.

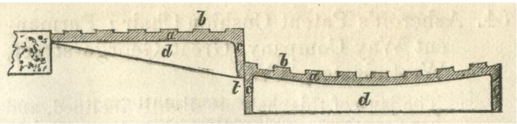
The chief peculiarity of this wheel is in the materials used. The nave is cast-iron; the spokes wrought-iron; and the rim or tyre is wrought-iron, with a facing of hard steel, both materials welded together in the process of rolling. The spokes form a series of loops of light hollow or gutter iron, placed back to back, the bend of the loops following the tyre in shape, whilst the two ends are cast into the nave. The hole in the nave is chilled to the same hardness as ordinary axle boxes. The wheels are made either straight or dished, and with flat or rounded tyres; the weight is little more than that of wooden wheels, and the cost is about the same, whilst the durability is much greater. They are specially adapted for hot countries.

70. Patent Caoutchouc Carriage Wheels; M. Davis, 5, Lyons-inn, Strand, W.C.

The periphery of the wheel is formed of a dish-like figure, in which the india-rubber lies, with a projection in the centre, dipping far down into the wheel, that as pressure increases so does security in proportion, and the rubber presents a curved figure to the road, similar to a new half-round iron tyre. The loose specimen tyre shows the form of india-rubber band employed, and is stated to have been used on the wheel of a Hansom cab.

71. Patent Channel Plates; Stephen Carey, Clink-street Wharf, Bankside, Southwark, S.

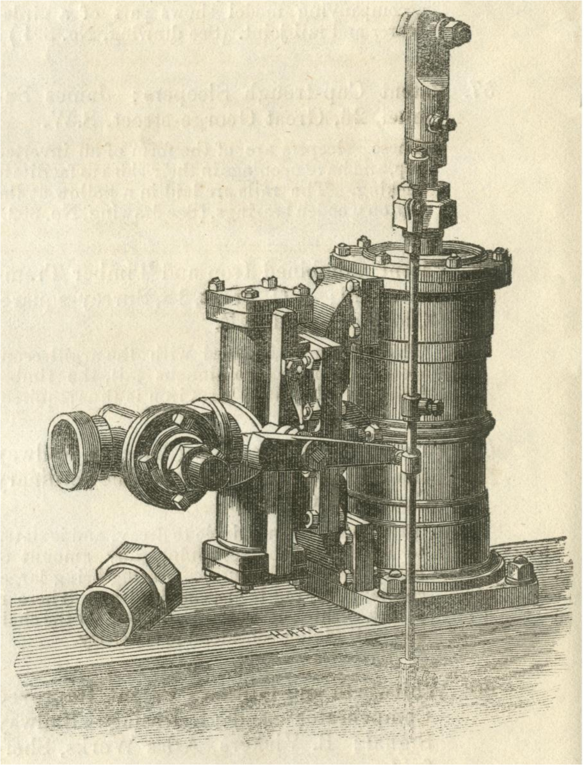




These plates may be cast of any width and length, the specimens are 16 in. × 16 in. superficial and 4 in. deep. The surface of the plate is concaved transversely ¾ of an inch, and has a series of broken fillets running longitudinally, which give a good foothold for the horse and allow the water to pass between, thus preventing the splashing.

72. Patent Hydraulic Engine for Organ blowing; David Joy, Queen-square, Leeds. Garrett, Marshall and Co., Leeds.

This engine is bolted by the flanges to an import of the organ, with its piston rod under or over the centre lines of the lever working the feeders; the water, at a pressure, is introduced at the cock, passes through the valves which are enclosed in the box, and gives a reciprocating motion to the piston rod, escaping at the pipe. (See *Journal of the Society of Arts*, Vol. VI., page 702.)



MACHINERY AND MANUFACTURING APPLIANCES.

(For the remainder of the Articles in this Section, see Drawings.)

73. Patent Apparatus for Producing at one operation Reverse Moulds for Casting Printing Surfaces; David Service, Barrhead, Renfrewshire.

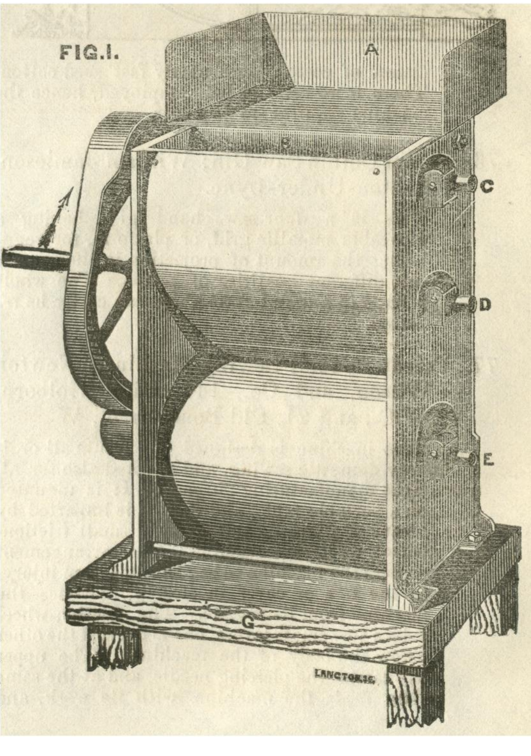
This machine produces two moulds at one operation, one on each side of the block of wood, the one being a complete reverse of the other. It consists of a perfectly level metal plate; an over-hanging bracket carrying a vertical reciprocating slide, to which is attached a tool-holder; a corresponding bracket underneath the plate, carrying a similar slide and tool-holder; and various arrangements for heating, by gas, the tools used in the operation of mould-making, and for moving and adjusting these tools, so as to burn into a block of wood, at one operation, a device or pattern and a reverse of the same, each surface being a perfect mould. The two slides being connected by a mechanical arrangement, they are simultaneously moved by means of a treadle, the descending tool entering the upper surface of the block of wood as the ascending tool enters, through an aperture in the plate, the under surface. The block of wood is moved by hand, according to the forms of the pattern or device, which is drawn only on the upper surface. The necessary adjustment of the tools is effected by lowering the upper one into contact with the lower by means of the rack and pinion movement on the adjustment slide; the lower tool-holder being made to turn round and fix in any position, while the upper one can be moved horizontally and transversely by means of the two small slides, and screws attached to the lower part of the adjustment slide which carries the top tool-holder. The tools can be made perfectly co-incident, and then raised to the required elevation.

74. Indian "Churka," or Cotton-Gin.* Exhibited by the Manchester Cotton Supply Association.

The committee of the Cotton Supply Association have received from the Bombay Chamber of Commerce two Indian churkas, or hand-rolling gins of native construction, and such as are now used by the natives of India, with a request that they should be submitted to the machinists of this country, with a view of obtaining, if possible, a superior machine. The objects to be aimed at in the making of an improved machine, are:—1. That the machine do no injury to the cotton, in the process of separating the seed from the fibre. It is said that no machine can possibly separate the cotton from the seeds with less injury to the staple than does the Churka. 2. That the machine, as far as possible, do rid the cotton from leaf and impurities. 3. That the machine be of simple construction, and durable. 4. That the machine be easily repaired by the native Indian. 5. That it be portable. 6. That the cost be as low as possible; (the Churka costs only two rupees, or 4s.); it is necessary that the improved machine should be within the ability of the natives to purchase. 7. That the machine be able to do its work faithfully, in spite of carelessness or neglect. 8. That the machine be able to clean a fair quantity of cotton per day, with the labour of one person (male or female). The committee submit the above conditions to the consideration of machine makers. It is proposed by the committee of the Cotton Supply Association, in furtherance of the wishes of the Bombay Chamber of Commerce, to hold a trial of the merits of the different gins, that may be constructed to meet the above conditions, in two or three months from the 25th March last. Due notice of the day of trial will be given. Premiums of £20, £10, and £5, will be paid by the Association to the exhibitors of gins which rank first, second, and third in order of merit.

75. Patent Toothed Roller Cotton Gin; Peter and Chas. Garnett, Cleckheaton, Yorks.

FIG. I.



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* The Churka is exhibited in order that persons in London may have an opportunity of seeing its method of working.

With a gin of this kind, 3 ft. wide, it is stated that two persons can produce 200 lbs. of cleaned cotton per day. This machine is substantially made, and contains a metallic roller and a spiral saw or steel ribbon inserted into the spiral grooves of the roller. When driven by steam or water power at the rate of 200 revolutions per minute, it will clean 400 lbs. for each foot in length per day. It is well adapted for all classes of cotton, particularly fast seed cotton. There is no band or belt employed, hence the machine requires small power.

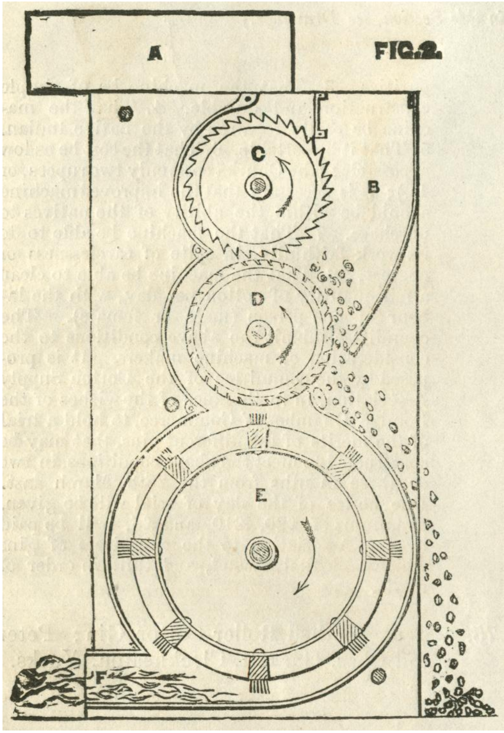


FIG.2.

76. Patent Cotton Saw Gin; William Jamieson, Ashton-Under-Lyne.

This is a four-saw hand gin, having a moveable metallic grid, or platform, for regulating the amount of projection in the saws to suit different qualities of cotton. The whole is fixed in a metal frame, and can easily be repaired.

77. Patent Boudoir Sewing Machine; Newton Wilson, and Co., 144, High Holborn, W.C., and 21, Old Bond-street, W.

This machine is designed to execute all ordinary domestic sewing, and adapted also for all light manufacturing purposes. It is mounted on a portable table, and motion is imparted by means of a treadle acting on a small friction-wheel, under the machine. This arrangement enables the machine to be protected from injury, as the box or cover in closing, detaches the machine from its treadle. The friction-wheel drives two small levers, one above and the other below the body of the machine. The upper one carries the piercing needle, and at the same time feeds the machine with its work, and carries it forward, regulating also, by a screw in the front, the length of stitch as may be desired. The under lever carries the looper or little instrument used in completing and securing the stitch on the under side of the fabric. There are two of these loopers connected with the machine. The one is simply a hook; and where the needle passes through the cloth, lays hold of the loop of tread, and retains it till the needle, passing again through the cloth, enters this loop and leaves another, drawing the first tight in its receding motion. The stitch thus made is that known as the tambour stitch. By changing the first looper, and substituting the second, a different stitch is formed. The hook of this looper has a longer point than the other, with an eye formed to carry a second thread; and the needle and the looper, by alternately intersecting the threads they respectively carry, form an interlocked or chain stitch on the under side. On the face of the fabric, the appearance of both stitches is alike, that of a back stitch. The thread is taken direct from the bobbin, and the stitch in each case is elastic, and therefore not liable to injury in washing or ironing. By adaptations which are attached at pleasure, the machine is made to turn down, fold, and hem, at the same time, also to lay and stitch binding on to the edges of a garment.

78. Patent Eyelet Machine; T. Gehrling, 15, William-street North, Caledonian-road, N.

In this machine the handle is so placed that the greatest power is obtained. Various sized punches can be readily adapted to it, and it can be easily adjusted for different thicknesses of texture.

79. Patent Hole-Punching Machine, for three sizes; T. Gehrling.

This machine is similar in construction to the eyelet machine, with the exception that by turning the head, in which three sizes of nipples are fastened, the required size of punch is brought into operation.

80. Patent Adjustable Binding Guide for Sewing Machines; Bradbury and Co., Oldham.

This apparatus consists of a series of upright steel pegs, over and under which the binding is alternately passed. It is then drawn in front of a shield, and passed through a guide having fixed tongues in it, which fold the binding so as to allow the needle to pass through it, and fix it to the fabric to which it is to be attached.

81. Patented Improvements in the Manufacture of Needles; H. Walker, 47, Gresham-street, E.C., and Alcester.

Fig. 1.

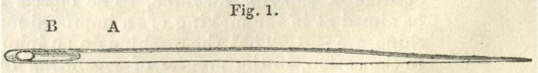


Fig 2.

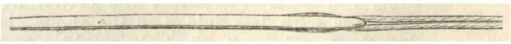


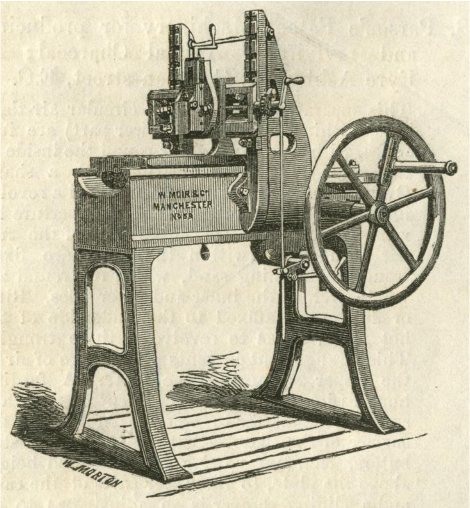
Fig. 1.—A is a ridge or raised part; B, the eye, which has a groove beyond it. Fig. 2 shows a side view of the parts, with the thread recessed as in sewing. This

needle is easily threaded, and the usual pressure of the thimble drives it with the thread through the cloth, without the least effort.—See *Engineer*, March 4, 1859.

82. Parmelee's Patent Machine Belting; North British Rubber Company, Castle Mills, Edinburgh.

This belting is formed of vulcanized India rubber, combined with cotton duck or fibres of cotton.

83. Hand Planing Machine; Muir and Co., Britannia Works, Manchester.



This machine is especially intended for the use of philosophical instrument makers, having been designed at the suggestion of Mr. Andrew Ross. It is worked by a continuous rotary motion, and is adjustable up to 1ft. 3in. long, 1ft. 3in. wide, and 1ft. high. It produces an almost uniform motion by means of a pair of elliptical wheels, and there is treble speed in the return motion.

84. Revolving Planing Machine; T. Gehrling, 15, William-street North, Caledonian-road.

This machine is principally intended for circular work, where the weight lies in the centre. The work may be easily fixed in it, either for planing or polishing. This model is combined with an eccentric chuck for ornamental surface-turning. The machine is made self-acting by an endless screw, so that when the handle is turned, the tool slides along the surface.

85. Patent Thermo-pneumatic Lubricator; Samuel Bickerton, Lower King-street, Oldham.

This lubricator depends for its action upon the expansive effect of heat and on the pressure of the atmosphere. When the lubricator—being about two-thirds charged with oil—is in close contact with a journal of a machine, a slight increase of temperature from the friction of the shaft will cause the air and oil to expand, and a portion of the oil to drop down. When the temperature falls the air and oil contract; a quantity of air is forced in, and the lubricator is thus again ready to act. The instrument thus becomes self-acting. Fig. 1 shows the lubricator itself, and Fig. 2 the method of fixing it.

Fig. 1.
Lubricator.

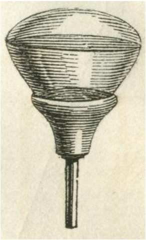
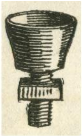


Fig. 2.
Fixing.

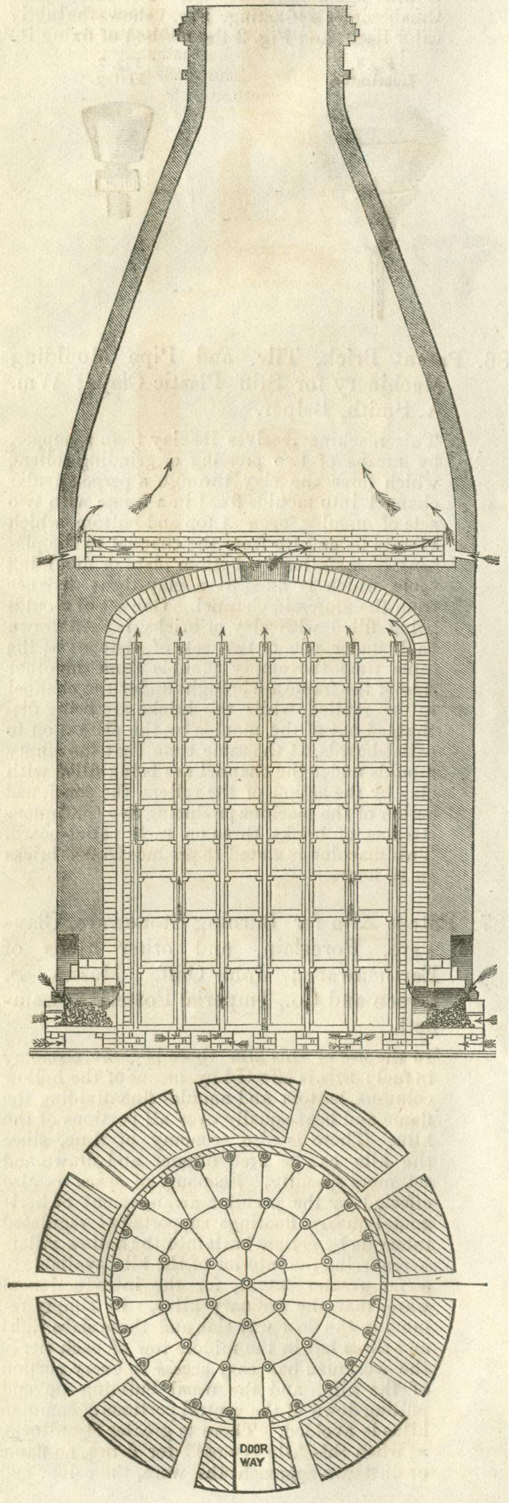


86. Patent Brick, Tile, and Pipe Moulding Machinery for Stiff Plastic Clays; Wm. A. Smith, Belper.

This machine receives its clay from a hopper, by means of two pressing or grinding rollers, which force the clay through a perpendicular channel into moulds fixed in a frame with two sets of moulds, open at top and bottom, which vibrate to and fro from the channel to the pistons on a stationary bottom plate or moulding table, which is fixed at a clay-tight distance from the aforesaid channel. One set of moulds being filled with clay or bricks, is then drawn back under one of two sets of pistons; at the same time the empty moulds from the other side of the frame are brought under the channel to be refilled, while the bricks are being discharged out of the moulds by the pistons on to pallet-boards, at the same time that the empty moulds under the channel are being filled with clay by the action of the rollers, the continued action of the machine producing two continuous streams of bricks, three on each pallet-board. This machine is stated to produce 25,000 bricks in 10 hours.

87. Patent Kiln for Burning Stoneware, Clayware, Porcelain, and other kinds of Earthenware; John Cliff. Messrs. S. Green and Co., Imperial Potteries, Lambeth.

In the use of this kiln there is great economy in fuel: this is effected by means of the hollow columns, bottom and annular flue dividing the flame and heat equally over all portions of the kiln. There is also economy of time, since the kiln can be fired oftener and drawn and set more speedily. Economy of space is also effected by the peculiar arrangement of horizontal quarry floorings supported at regulated intervals by collars built into the hollow pillars —rendering the interior of the kiln available to a far greater extent, for the introduction of ware, than the ordinary kilns. By simply removing the door way slab and three slabs right and three left in the middle row of each tier—the workman has easy access to every portion of the kiln, and the usual building up and pulling down of the central portions of common kilns is avoided. There is greater cleanliness, as when this kiln is closed for firing, no flame or dust can approach the ware, the colour and body of which is safely regulated by the equal distribution of heat which the interior sustains. The same means that effect the rapid gain of heat, expedite the cooling and that with equal regularity. The stunting of the ware, by sudden changes of temperature, is much obviated by the deflecting top, and the flow of cool air between the inner lining and the lining of the kiln—under the bottom and up the hollow pillars—but not upon or through the goods. Other advantages are a more perfect combustion of smoke by the increased distance it has to travel, and the large surface it is necessitated to pass over, the air being admitted as required by the flue over the fire-place (seen in section of model), which is closed and opened by sliding bricks. It is again met by currents of fresh air at its exit from the edges of the deflecting floor; and when the kiln is hot, the combustion at this point is very preceptible.



88. Parson's Patent Machinery for producing and revivifying Animal Charcoal; E. Eyre Ashby, 61, Coleman-street, E.C.

This apparatus consists of a circular air-tight case, within which (at the lower part) are furnaces, with flues extending round the inside of the case, and communicating with a shaft. Over the surfaces and flues is placed a revolving metal disc or hot plate, with an aperture towards the centre. On either side of the furnaces and flues (within the case) are fixed troughs containing sand, which run round the whole circle of the inner and outer sides. Rims or flanges are affixed to the underside of the hot plate, so as to revolve in these troughs. This arrangement prevents any passage of air to the upper surface of the plate. A feeding hopper (fitted with slide to prevent access of air) supplies the matter to be operated upon to the surface of the plate. Spreading rollers, distributors, &c., are fixed at the required height above the plate, to the upper parts of the case, and a sliding scraper is so adjusted as to be capable of quickly discharging the whole of the matters through the central aperture into a receiving chamber in the lower part of the machine. Ventilating pipes, with valves, are fitted into the cover, to provide for the escape of steam and gases. Motion can be communicated to the revolving plate, or to a shaft carrying it, by a simple mechanical arrangement, which does not interfere with the perfectly air-tight condition of the upper chamber or retort.

89. Patent Mill-Stone Staff; John Maninng, Boyne Engine Works, Leeds.

This instrument may be applied to any flat object as a test of the truth of its surface, but is more particularly applicable to mill stones. It is intended to avoid the risk of marking the low as well as the high places on the mill stone, as often occurs with the ordinary staff. Three small pieces of cast-iron are let into and below the surface of the mill-stone; these are drilled, and receive the points of the adjusting screws or feet which carry the lower of two metal discs resting one on the other, their surfaces in contact, being made perfectly true. The upper disc carries the staff itself, which is again made adjustable by four set-screws. The boss on the upper disc receives a trail-rod, with a thimble screw in the end of it. The hole in the centre allows the mill spindle to pass through. In using the staff the two discs are set on the stone without the staff itself; the three lower screws are adjusted until the point of the trail-rod screw, in passing through the circle, touches the face of the stone at the four quarters. The face of the staff is then dressed with a colouring substance, and placed on the upper disc; the screws are lowered till the staff touches the stone, when one revolution will mark all the high places; these are dressed off in the usual manner, and the operation repeated till a perfectly true surface is obtained. When once set the instrument may be lifted on and off a mill stone as often as desired, without further adjustment; or the staff only may be removed, and the discs left standing until the operation of dressing is complete. The staff may be modified to suit conical mill stones of any angle, and will obviate the great difficulty hitherto experienced in dressing them.

90. Patent Hydraulic Lifting Jack; Daniel Adamson and Co., Newton Moor Iron Works, Hyde, near Manchester.

This apparatus is composed of two main parts, the lower and outer side-case or cylinder, and the top and inner ram. A small inverted pump is fixed at the lower end of the lifting ram, which is worked by a lever and rocking shaft passing through the square head or top part, which top also forms a cistern to contain as much oil or water as will lift the ram the required height. When the jack is used for lifting, the oil contained in the head of the ram is forced into the outer case or cylinder at bottom, which causes the ram to ascend. When required for lowering, the lever is partly drawn off the working shaft until the second projection can come in contact with the head of the jack; by depressing the lever in this position, a quick or slow lowering motion is obtained without manual labour. It is stated that with this apparatus one man can do as much work as four men with screw jacks of equal power.

91. Registered Adjustable Bench-Vice; Easterbrook and Allcard, Albert Works, Suffolk-road, Sheffield.

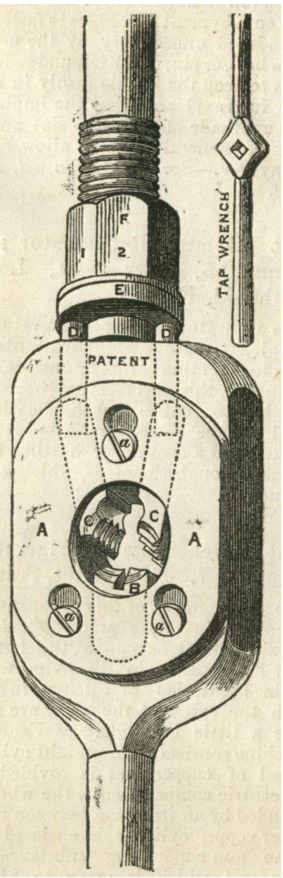
This vice has a ball and socket-joint applied to one of the legs, which allows the jaws to adapt themselves to any shaped object that a workman may wish to grip, however taper or conical, answering equally well for holding any parallel object.—(See *Mechanics' Magazine*, Nov. 20, 1858.)

92. Patent Ratchet Brace; Easterbrook and Allcard.

The peculiarity of this brace is, that it can be adjusted so as to bore at an angle, and in a position where a brace with a straight-sided ratchet wheel would be inapplicable.

93. Patent Direct Action Guide Screw Stocks; Chatwin and Taylor, 58, Broad-street, Birmingham.

By this stock screws of several sizes can be cut, without changing the dies, where one pitch of thread is used. Another advantage in this stock is that the dies can be taken out and ground, which cannot be done with the ordinary dies now in use.



94. Registered Pipe and Nut Wrench; W. Heap, Oldham Road Tool Works, Ashton-under-Lyne.

This wrench is designed for connecting or disconnecting the screwed joints of gas, water, or steam pipes, and for turning the nuts on screw bolts. The handle is formed with a screw-thread to receive a milled nut. A claw is formed on the end of the handle, and between it and the nut is a sliding collar, formed with lugs, to which is jointed the short lever, forming a moveable or loose jaw. The part of the handle on which the collar slides may be made square or hexagonal in form, or, if it is made round, it must be formed with a groove to receive a steadying pin fixed in the collar, to prevent the latter from turning round. A small spring is attached to the collar, to act against the loose jaw, and press it inwards, whilst the loose jaw has a projection which prevents its being forced too far outwards. The claw and loose jaw are serrated, so as to take a firm hold of the pipe; and by turning the milled head, the loose jaw is adjusted to various sizes of pipes.

95. Patent Picks, Mattocks, and Hammers; W. and C. Kaye, Howarth Works, Lockwood, near Huddersfield.

These tools have tapering eyes for the handles, which can therefore be readily fixed or removed. The employment of wedges to fasten the handles is rendered unnecessary by the use of a short screw bolt, or pin, which is found sufficient in these tools to keep the handle firmly in its place, and give increased power to the implement. The eyes are made of the same size and form, if of the same general class, to allow any handle to fit any eye.—See *Mining Journal*, August 14th, 1858.

96. Patent Rotary Refrigerator; W. W. Wynne, 5, Barr-street, Lower East Smithfield, E.C.

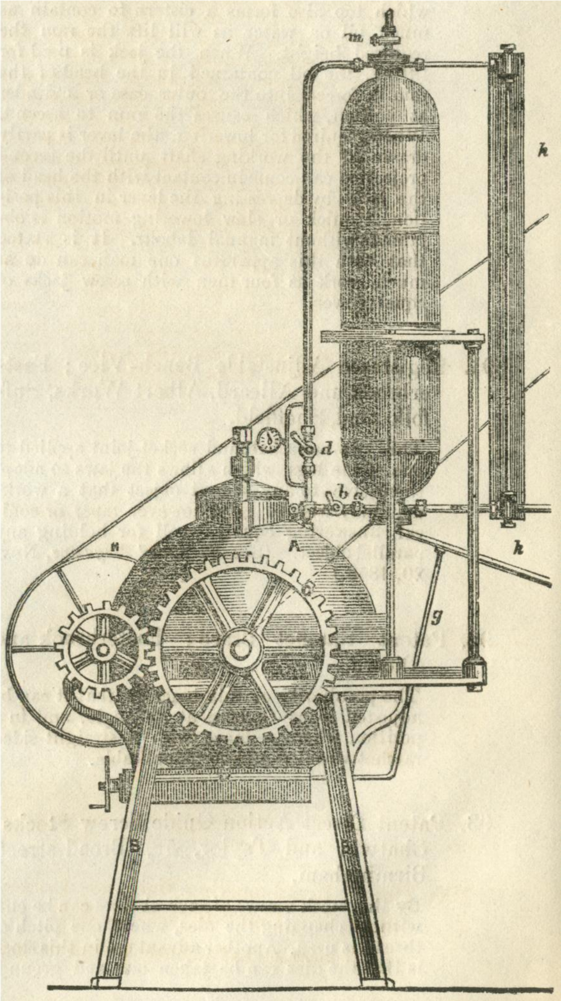
This apparatus consists of several tanks, in each of which is a tube passing backwards and forwards so as to form three arms or beaters, which rotate on an axis, this axis forming the main tube, and running the entire length of each tank. The liquid to be cooled or heated is placed in the tanks; and a cooling or heating fluid is made to pass through the pipes, which are then kept in motion.

97. Patent Regenerative Refrigerator; C. W. Siemens, 7, John-street, Adelphi, W.C.

The arrangement of this apparatus is such that a cold solution, nearly 30° degrees below freezing point, even in the hottest climate, may be produced by dissolving within it crystallized chloride of calcium in water, when both the salt and the water are at a temperature a little below 62° of Fahrenheit. The machine consists of an upright cylinder, or open vessel of copper, and is divided into several concentric compartments, the whole being surrounded by an iron case, between which and the outer copper cylinder is enclosed a quantity of some non-conducting substance (cow-hair). The salt which is made to fill the central chamber, is supplied to the machine through the open funnel from above, in sufficient quantity to supply the vacancy caused by the dissolving of the salt by a divided stream of water entering from below. The solution thus formed escapes from the bottom of the inner chamber, and ascends in the annular cavity surrounding the dissolving chamber, between double walls forming close concentric chambers, which are filled with water entering from suitable pipes at the top, and escaping from the bottom. This water may be used to supply the divided stream which enters the central cavity where the salt is dissolving, or to furnish a supply of iced water for household consumption. The refrigerating solution ascending between these double walls, abstracts heat from the water enclosed within them. The water in the lower part of these concentric walls, around which the salt solution first enters, will be cooled to nearly freezing point, and to a gradually less degree higher up as the salt solution ascends, and becomes itself warmer until it escapes through an overflow-pipe at a temperature nearly equal to that of the water on first entering the close chambers of the apparatus. The mass of salt, gradually descending in like manner, is being cooled by the surrounding fluid, and both the salt and the water being thus cooled down to nearly 32° Fahr. preparatively, it follows that the fresh solution, which is continually being formed in the central cavity, will be nearly 30° below freezing point, and will readily produce ice in the conical vessels, containing water to be frozen, which are introduced into the central cavity. These vessels may be removed for the purpose of being refilled at intervals of about twenty minutes, that space of time being sufficient to convert the whole of the contents into ice, except only when commencing the operation. In the space which occurs, within the machine, occupied by the solution of salt before it escapes, a number of bottles of wine, ale, or other liquor may be cooled in an equally short time. The solution of chloride of calcium may, from time to time, be recrystallised. The salt employed being thus recovered, ice may be obtained, after the original outlay, at the expenditure of fuel only. On the average this expenditure amounts to about one pound of coal for each pound of ice obtained; but in tropical climates the sun's rays alone are sufficient to effect the evaporation.

98. Patent Aerated Bread; Peek, Frean, and Co., Dockhead.

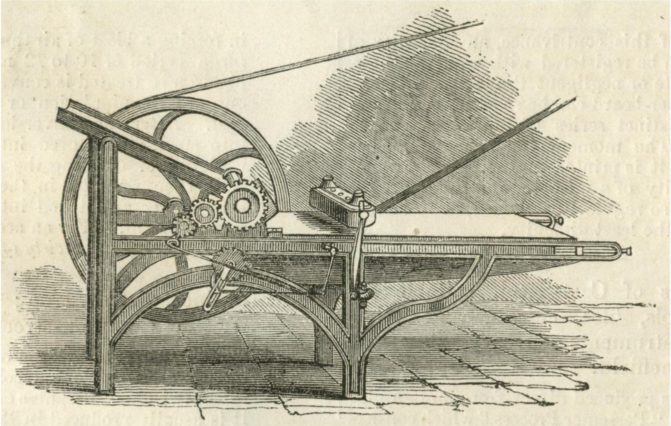
In this bread, as in the ordinary fermented bread, the vesicular structure is imparted by the expansion of carbonic acid gas within the



substance of the dough; but, whereas in fermented bread the carbonic acid is derived from the fermentation or degradation of a portion of the flour itself, in this bread the pure carbonic acid gas is superadded to the flour, which does not undergo any degradation whatever. A is the vessel in which the flour, water, and salt are mixed together. It consists of a very strong iron globe, 3 feet in diameter, capable of bearing a pressure of 300lbs. on the square inch; it has an opening at the top, to which an air-tight cover is fitted, and an opening at the bottom, also capaple of being closed air-tight. Through its centre a shaft or rod passes, on which are fitted iron mixing arms; this shaft or rod has the wheel G fitted to one end, in which a smaller wheel works, which smaller wheel is moved by the pulley H, which in its turn receives motion from a steam engine. L is the water vessel, made of copper, and tinned inside; the bottom of this vessel communicates with the vessel A by the pipe *a*, in which there is a stopcock *b*; the top communicates by the descending pipe *l*, in which is the stopcock *d*. To this copper vessel is attached a water gauge *h*, which marks the number of gallons drawn in or out of it. Through the bottom the pipe *k* enters, and terminates within by a rose. To work this apparatus, flour and salt are put into the vessel A, which is afterwards closed air-tight, and after exhaustion of the air contained in the vessels A and L, water is drawn into L through the stopcock *m*. Carbonic acid gas is then forced through the pipe *h*, and being discharged from the rose, bubbles through the water, rises to the top, and passes down the pipe *l* into the vessel A. By this means the vessels are filled with a condensed atmosphere, and the water is saturated at the same time. When sufficient fixed air has been forced into the vessels the stopcock *b* is opened, and the proper quantity of water is run into the flour. The mixing arms are then set going, and in from four to six minutes the dough is perfectly mixed. It is then drawn into pans or moulding baskets in the same way as soda water is drawn into bottles, &c., and is passed into the oven without being touched by the hands. During the drawing the carbonic acid gas, dissolved by the water while under pressure, is evolved, and by its expansion raises the bread.

99. Bread-Making Machinery; John Miller, Upper George-street, Edgeware-road, W.

The machine exhibited is that portion of the machinery, which forms the dough into loaves, as shown in the wood cut. It consists of a sloping platform, which delivers the dough into a pair of steel rollers working horizontally at the end of it, capable of adjustment at any suitable distance. After passing through these rollers the sheet of dough falls on an endless web revolving horizontally, which, by means of a simple mechanical arrangement, is carried step by step the exact space required for the cutter, which stamps out the loaves in succession as it is carried along the web. The pieces of dough thus cut, which are not more than three-quarters of an inch thick, are set side by side on flat tins, and placed in a warm atmosphere for about thirty or forty minutes, until the dough has risen somewhat, when they are put in the oven. The other machinery used by Mr. Miller comprises a mixing machine and a kneading machine. The mixing machine consists of an iron cylinder, through which a horizontal axis passes, having a series of beaters, or blunt knives, fixed at right angles to it. Each knife or beater is bent round, in the form of an oblong parallelogram, which extends from the axis to within a short distance of the inner surface of the cylinder. The cylinder is stedfast, while the axis carrying the beaters revolves inside. The materials for making the bread are placed inside the cylinder, and in a very short time, by the action of the machine, they are thoroughly mixed. The kneading is performed by passing masses of the mixed material, after it has stood a sufficient time, through a pair of steel rollers several times, and thus it becomes kneaded and thoroughly amalgamated into a uniform dough, suited for passing into the machine exhibited, which forms it into loaves. (See *Journal of the Society of Arts*, vol. vii., p. 236.)



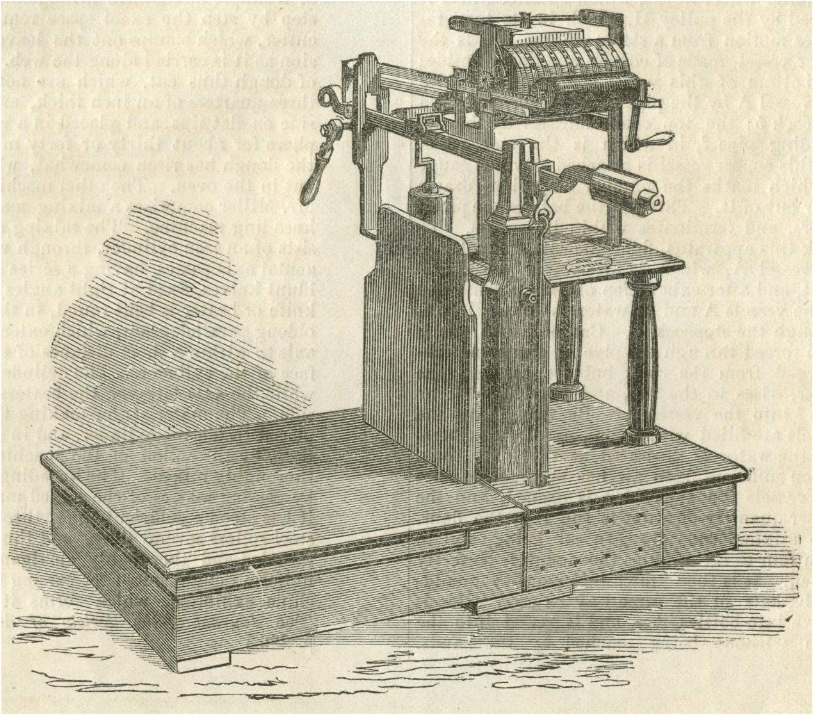
100. Patent Bread-making Machine; E. Stevens, 5, 6, & 7, Cambridge-road, N.E.

This machine has a double bottom for containing hot water in cold weather, to regulate and force if you wish the sponges and doughs, avoiding the necessity of using so much hot liquor, which is injurious to the bread. In very hot weather this chamber can also be used for cold water, to keep the sponges and dough cool, which always generate heat in fermentation, (particularly in hot weather); this application of cold water will cause the fermentation to work gently, producing better bread. The mixer is kept in its place by means of the pawl, which has only to be raised, when the mixer is taken out of the machine; by this means the trough is perfectly even and smooth inside in every part.

101. Patent Kneading Machine; Charles Quintin, Cheltenham.

In this machine a horizontal shaft traverses the entire length of the interior, to which are attached beaters, &c., which in their revolving beat the flour into a dough, incorporating the yeast, flour, and water. The process of kneading a sack of flour or 5 bushels, 280lbs., is stated not to occupy more than six minutes.

102. Porquerée's Patent Self-registering Weighing Machine; Burgess and Key, 25, Newgate-street, E.C.



By means of this contrivance, any quantity of weights can be registered with accuracy, however illiterate or negligent the attendant may be. The paper-board can be so shifted that any new and distinct series of figures can be registered. The moment the exact weight is ascertained, it is printed on the paper, without the possibility of a mistake, and the figures so printed are so regularly arranged, as to be cast up without the least difficulty.

103. Sample Bars of Cast-Steel, suitable for turning-tools, files, chisels, and other cutting instruments; Henry Bessemer and Co., Sheffield.

This steel is produced direct from molten pig-iron, by the "Bessemer Process," which consists in forcing a blast of air through the fluid metal for a period of 10 to 12 minutes, whereby the pig-iron so treated is converted into steel without any manipulation or the employment of fuel. After the conversion of the crude iron into steel, it is poured into water for the convenience of dividing the steel into fragments, it is then remelted in the usual manner, cast into ingots, and tilted into bars of the desired size and form. (For an account of the process, see *Journal of the Society of Arts*, Vol. v.)

104. Machine-twisted Iron; John Reynolds, 57, New Compton-street, W.C.

The advantages over the ordinary twisted iron are that, being worked cold, greater accuracy in the twist and sharpness of outline are secured. It is usually produced in 12-feet lengths.

NAVAL AND MILITARY APPLIANCES.

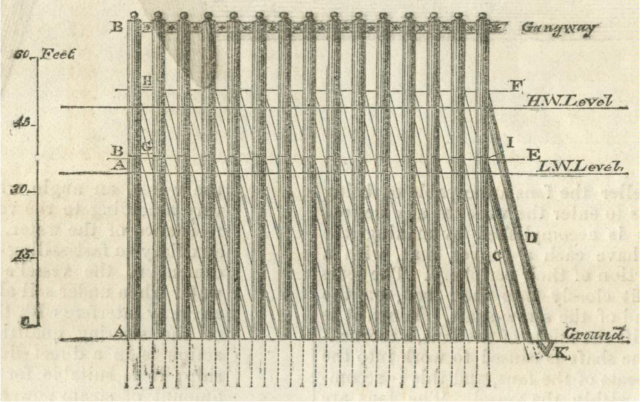
(*For the remainder of the Articles in this Section, see Drawings.*)

115. Permanent Groyne, for the Sea Coast; Edward Manico, Lieut. R.M., 4, Barge-yard, Bucklersbury, E.C.

The model exhibited, representing 100 feet in length, and 30 feet in width, on a scale of 6 feet to an inch, is intended to show how the *caissons de fer*, viz., hollow fabrics of iron, each a cube yard, filled with stones, may be used in the construction of permanent groynes, for gathering, and retaining the beach, as a protection to all parts of the coast exposed to the ravages of the sea; also its adaptation as a temporary breakwater or fender, behind which the outworks of piers and harbours may be safely carried on; and the banks of canals or rivers, liable to disruption, rendered safe.

116. Wave Screen; E. K. Calver, R.N, Admiralty Surveyor, 16, Roker-terrace, Sunderland.

This structure consists of nine principal parts, and is disposed in two courses, offering alternate spaces, which extend from the bed of the sea to above the highest level of the water. It is intended to supersede the stone breakwaters, and is designed in accordance with the belief of the non-percussion of the main-mass of deep-water waves, or undulations, and its effect (as proposed by the inventor) would be to afford sufficient protection to vessels anchored under its defence, and at the same time, in accordance with well-known laws, to render the space enclosed by it permanent in depth. (See woodcut.)



117. Diving Dress, with Apparatus for Facilitating Breathing under Water; J. White, Finchley, N.

This apparatus consists of a metallic covering, fixed closely round the nose and mouth by means of a band fastened round the head. In connection with this covering, there are two pipes, each provided with a valve, one with an inlet valve for the supply of fresh air, the other with an outlet valve for the passage of the air exhaled from the lungs. Two pipes, which are fastened by a bayonet-catch, are attached to the ends of these pipes in the mouth-piece, and the other end of each of them is turned downwards and fixed in the upper part of a vessel so constructed that it will float on the water, and admit air into the lungs, but prevent the admission of water. This vessel consists of a funnel, covered with perforated tin. Into the larger part, the tubes before-mentioned are fixed, and the whole is supported in an upright position, and partly immersed by means of weights attached to the lower end, and floats to the upper. All water thus entering by means of the perforations escapes down the tube. In communication with the pipes, are compressible and expansible chambers, capable of being operated on at the will of the diver, as a means of increasing or decreasing his buoyancy, and so enabling him to ascend or descend in the water.

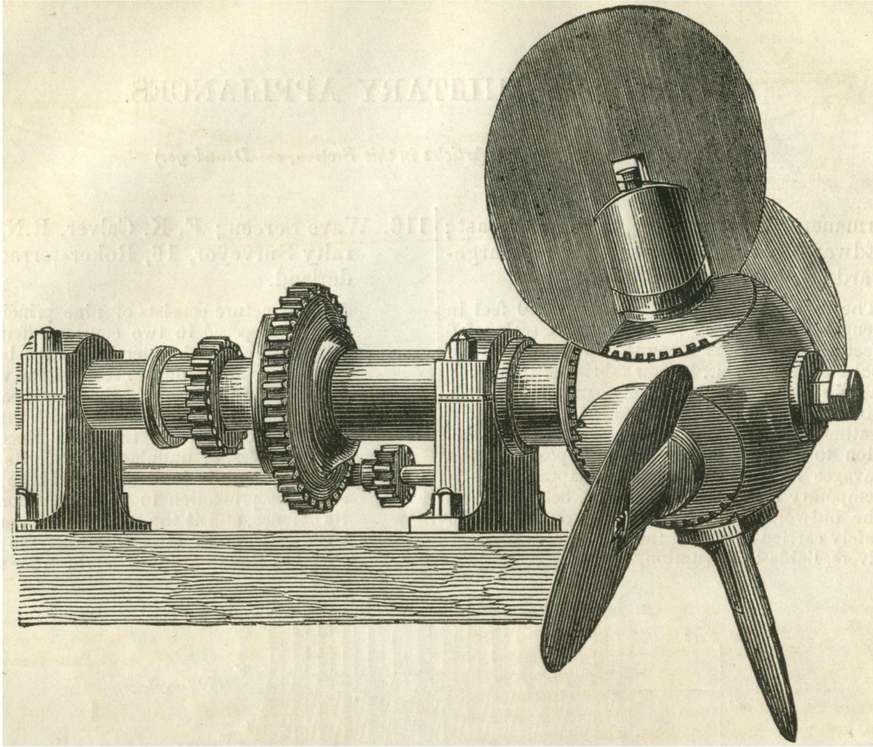
118. Apparatus for Examining and Repairing Dock Gates; B. Hocking, Gateshead.

This apparatus is designed for the purpose of enabling dock gates and their machinery to be examined and repaired without interrupting the business of the dock or canal.

119. Patent Improved Screw Propeller; Robert Griffiths, 69, Mornington-road, N.W.

The improvements in this propeller over former patents, consist in the method of securing the blades on the boss by the strong malleable iron cotters, which both firmly secures the blade, and is also the means by which the pitch of the screw is to be altered. Wood blocks are placed on each side, which are readily adjusted. The other improvements consist in curving forward towards the vessel the outer parts of the blades.

120. Patent Royal Alfred Feathering Screw Propeller; William Hewitt, Bristol.



In this propeller the fans are capable of being adjusted so as to enter the water at any desired angle. This is accomplished by making the fans, which have each a convex seat, with a rack on a portion of their periphery. The seats of the fans fit closely into their bed, on the spherical head of the screw-shaft. When it is desired to shift the angle of the fans, a toothed-gearing on the shaft is caused to work into the rack on the seats of the fans, and this is accomplished from within the vessel. The fans are made quite flat and circular, and are said to enter and deliver themselves without any apparent disturbance of the water, also obviating to a very considerable extent what is denominated the slip of the screw. This screw can be constructed either with two, three, or four fans, which can be worked with perfect safety at any angle, there being no diminution in strength at whatever position it is found desirable to set them to, neither can it get deranged by a sudden reverse or backward motion. Another feature is, that a disabled fan can be immediately removed and replaced by another, without having to remove either the boss or shaft, or placing the vessel in dock. The trunk, or chamber provided for lifting the screw out of the water is entirely dispensed with.

121. Vertical Propeller; Thos. Spiller, 5, Red Lion-square, W.C.

This Propeller, in its action on the water, is very much like the tail of the whale, dolphin, or porpus, fish that swim on the surface of the water. Its motion is vertical, the propeller assuming in its descent and ascent through the water, an angle which may be made to vary according to the velocity of the vessel or resistance of the water. It is adapted for an auxiliary to fast-sailing vessels, being no impediment to the vessel's progress through the water when under sail alone, and it does not in any way interfere with the action of the rudder, or the steering qualities of the vessel. Its action is in a direct line with the keel of the ship; it is suitable for any depth of water or amount of steam power. The fins being horizontal, it is stated that they will give as much propelling force in seven feet of water as the screw in 27 feet. The propeller may be applied in any part of the dead wood of the keel, not so near the rudder as the screw.

122. Screw Propeller; George Pringle, Preston Grange, Prestonpans.

123. Ship Propeller; Greenwood, 23, South Audley-street, W.

The wheel is furnished with float-boards made with bevelled edges, and revolving freely on a single axis. By these means alone the float-boards are kept square to the line of the vessel's keel when freely worked in the water. They have then only to be kept edgewise in the case of the wheel until they are required to act, which is at the lowest point on each side of the keel. Thus the float-boards only work when they arrive at the most effective point for propelling the ship; and, however rough the sea may be, or the ship rolls, they even act in a deep and solid mass of water.

124. The Life-Boat of the Royal National Life-Boat Institution; 14, John-street, Adelphi, W.C.

Fig. 1.

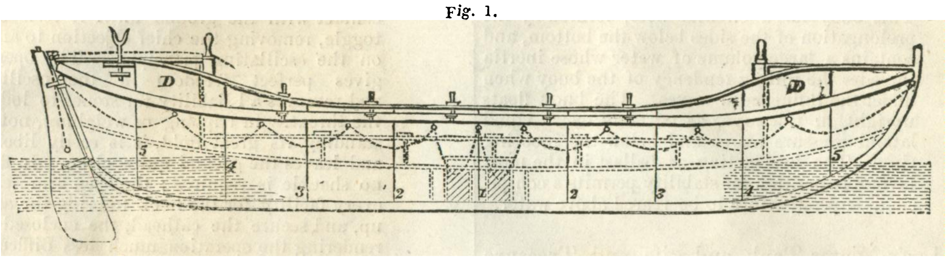
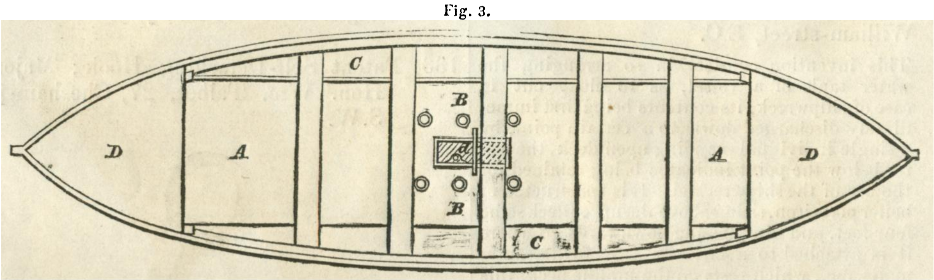


Fig. 3.



The accompanying figures show the general form, the nature of the fittings, and air-chambers of one of these boats, 30 feet in length and 7 feet 6 inches in breadth. In figs. 1 and 2, the elevation and deck plans, the general exterior form of the boat is shown with the sheer of gunwale, length of keel, and rake or slope of stem and stern-posts. The dotted lines of fig. 1 show the position and dimensions of the air-chambers within board, and of the relieving-tubes. In fig. 2, A represents the deck, B the relieving-tubes (6 inches in diameter), C the side air cases, D the end air-chambers. In fig. 3, the exterior form of transverse sections, at different distances from stem to stern, is shown. Fig. 4 represents a midship transverse section, A being sections of the side air-cases, B the relieving-tubes, bored through solid massive chocks of wood of the same depth as the space between the deck and the boat's floor. C, C, are spaces beneath the deck, filled up, over 6 feet in length, at the midship part of the boat with solid chocks of light wood, forming a portion of the ballast; *d* is a section of a small draining-tier, having a pump in it, by which any leakage can be pumped out by one of the crew whilst afloat. The festooned lines in fig. 1 represent exterior life-lines attached round the entire length of the boat, to which persons in the water may cling till they can be got into the boat; the two central lines are festooned lower than the others, to be used as stirrups, so that a person in the water by stepping on them may climb into the boat. This boat was designed by Mr. James Peake, Master Shipwright in H.M. Dockyard, Devonport, and built by Messrs. Forrest, of Limehouse.

Fig. 3.

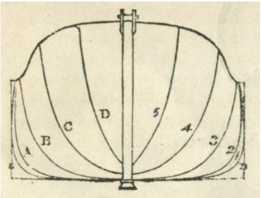
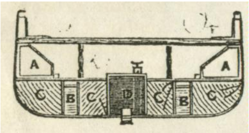


Fig. 4.



125. Twin Life Boat; A. Baker, 63, Nelson-square, Blackfriars, S.E.

This boat is stated by the inventor to be also suited for use as a gun-boat.

126. Apparatus for Saving Lives from Stranded Vessels; Captain Thomas Kisbee, Royal Navy.

This apparatus can be constructed from materials in nearly all cases at hand on board ship.

127. Improved Boat; Thomas Sutton, St. Brelade's, Jersey.

This model represents a boat constructed entirely of straight timber. The mode of construction is not only economical, but the greatest possible amount of speed and stiffness under canvass is stated to be secured by it. The great length prevents leeway, at the same time that the draught of water is small compared with what is usually thought necessary to a boat of the same size. Vessels of any size may be constructed on the same principle, the length being of course increased in proportion to the beam, and the height of the masts depending on the beam of the vessel at the part where they are stepped, and not upon the length. The model is made to the scale of one inch to the foot.

128. Patent Ship's Cabin Ventilator. William Chadwick, Bury, Lancashire.

This consists of a smoke-jack, placed horizontally in a small chimney above the cabin lamp, surrounded by a cowl formed of spirally curved plates.

129. Patent Keel Buoy; B. Stoney, 89, Waterloo-road, Dublin.

This buoy has a circular keel, formed by the prolongation of the sides below the bottom, and contains a large volume of water whose inertia impedes the rolling tendency of the buoy when under the influence of waves. The buoy floats upright in tideways, as currents exert equal lateral pressure above and below the mooring ring. The keel acting as ballast in the most favorable position for stability permits a conspicuous superstructure to be reared above water.

130. Lee's Water Tank and Life and Treasure Buoy; Lansing, Starr, and Co., 74, King-William-street, E.C.

This invention consists in so arranging the water tank of a vessel, as to float out in case of shipwreck, its contents being first immediately discharged down to a certain point, by a single individual standing upon deck, the water below the point indicated being retained for the use of the shipwrecked. It is constructed of boiler plate iron, rising above the upper deck some four feet, and diminishing downwards to where it is attached to a chest or safe, for treasure, mails, &c., which rests on the middle deck, this form giving it an easy exit from the vessel, whatever be the position in which it may go down. When afloat, the chest or safe acts as ballast, and keeps it in a vertical position. Ordinarily it fits securely into a hatchway, which is protected against leakage by a flange surrounding the buoy, and resting upon the deck, after the manner of the combings of a hatch. In case of necessity, the flange is the foot-board on which the passengers and crew stand, to secure themselves by guards, lashings, &c., to the body of the buoy. The interior is divided into several compartments. (See Drawing No. 432.)

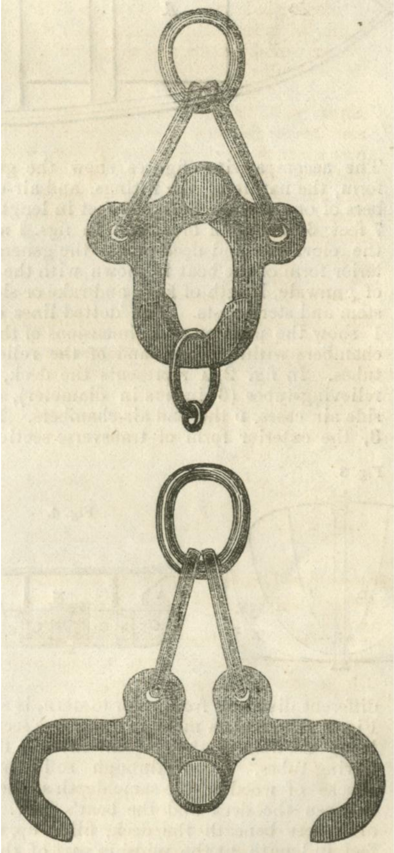
131. Gresham's Patent Record Buoy; George and Joseph Oliver, 286, Wapping, E.

This Buoy is intended to be kept in some place available for instant use, and to be thrown overboard from a sinking ship, or a vessel on fire, so as to intimate disaster, having a paper inserted therein. It has capacity and buoyancy to contain, besides these, the log-book, and several pounds' weight of papers or valuables. It is lined with cork between the cylinder and outside case, so that, although waterlogged, it will not sink, but keep afloat probably for years. In order to distinguish it from any other floating substance, so that the captain of a passing ship may recognise it as an intimation of disaster, it has, raised conspicuously upon its surface, a silvered globe, which, owing to the reflection of the light, will make it visible a great distance.

132. Patent Anchor, with Oscillating Arms; Samuel Hunter, Newcastle-upon-Tyne.

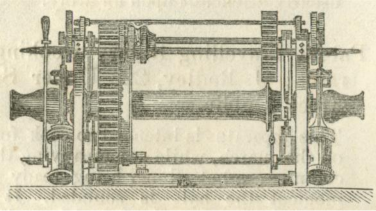
This invention consists simply in enclosing the palm within the arm, and keeping the latter open—the sides being parallel—up to the crown, so as to allow the earth to rise and pass over the palm and through the arm in a solid state, which arrangement gives greater strength and holding power. In the important property of canting, it possesses great advantages; it being almost self-acting, for it meets with no obstruction from the palm, as in other anchors; the curve of the arm being in uninterrupted contact with the ground until it rests on the toggle, removing the chief objection to anchors on the oscillating principle. The open arm gives perfect freedom in the oscillation, and removes all liability for stones to lodge in the throat. In tripping or weighing, notwithstanding its great hold, it is easily liberated, and leaves the ground quite clean. In fishing no shackle is required; the open arm leaving every facility for the hook to bring the anchor up, and secure the cathead, the enclosed palm rendering the operation much less difficult, at the same time protecting the bows and painting of the vessel from injury.

133. Patent Self-Detaching Hook; Major the Hon. Wm. Talbot, 27, Chesham-place, S.W.



The object of this invention is, that the hooks attaching boats should be so formed that as soon as the weight of the boat is removed therefrom, by contact with the water, the hooks may be self-releasing. Each hook or support forms a lever, one end of which is connected by a pin joint to the corresponding end of the other lever, and at the point of their suspension they form two separate links which hang from a ring common to both. The lower ends of these levers are bent into the form of a hook, and are capable of lying one across the other. When a weight is hung to the hooked end of the levers, and they are caused thus to cross each other, in that position they form a secure support. But as soon as the weight is relieved therefrom, these levers open or separate at their hooked ends, and clear the ring or other attachment by which they held the weight. Supporting connections thus formed are applicable as self-acting releasers when lowering merchandise, minerals, &c., and thereby save labour. (See *Practical Mechanics' Journal*, December 1, 1858.)

134. Patent Double Cylinder Steam-Winch; James Taylor and Co, Britannia Works, Birkenhead.



These winches have two cylinders, bolted to the frames; thus a fly-wheel is dispensed with. They are made of different powers, with cylinders from 5 to 10 inches and upwards in diameter, and are fitted with single and double purchase, for quick and slow motions as required, the clutch lever being so arranged as to throw one pinion out of gear at the same time that it throws the other pinion into gear, thus preventing the possibility of derangement. The spur-wheel is fitted on one end of a barrel shaft, carrying a friction wheel with strap, which is operated upon by a foot lever. A small boiler is placed in any convenient part of the ship, and the steam-pipes leading to the winches are usually carried immediately below the deck, with a branch leading into the different holds, and a stop cock. This can be used with effect as a fire extinguisher, without causing a ship's cargo to suffer unnecessary damage, as by the ordinary method of scuttling.

135. Slings for Raising Sunken Vessels in Deep Water without Divers: Edward Austin, 2, Trafalgar-square, Greenwich, S.E.

This model illustrates the arrangement of the chains for forming the slings.

136. Balestrini's Electric Sound; Perreaux and Co., 39, Mark-lane, E.C.

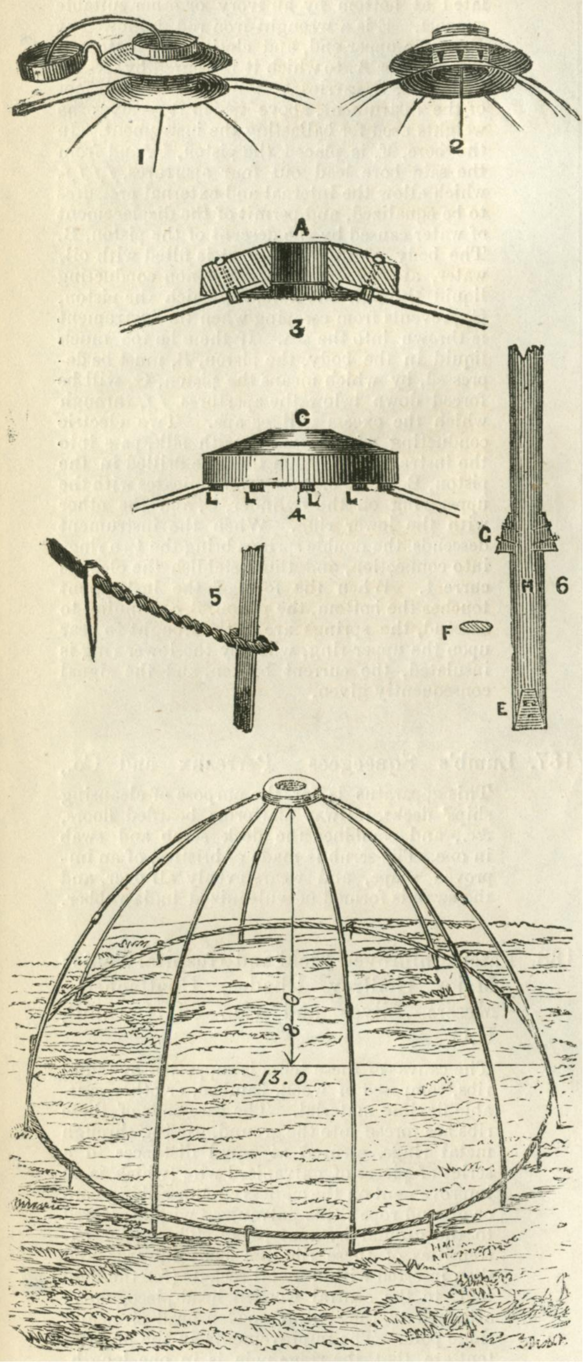
In this apparatus there is a plummet connected with wires leading to a battery, in such a manner that upon the plummet reaching the bottom, a part of the apparatus shall rise or fall, so as to make or break the electric current, and cause the ringing of a bell, or give motion to some other electric indicator. Upon this indication being observed, the line will be examined and the depth read off. See drawing, No. 433, which represents a section of the instrument. A, is a cylinder of cast-iron or brass; B, is a wrought-iron piston within the cylinder A, having a hole drilled through it in the position and direction of its axis; C is a cylinder of hard wood, the outside of which is furnished with two rings of brass and platinum combined; D is a double spring of plated steel, serving to establish the electric communication. This spring is insulated at bottom by an ivory or other suitable support. E is a wrought-iron rod, hollowed at F, at the upper end, and closing the bottom of the cylinder A, to which it is secured by screws. This rod, E, carries at its lower end the foot of the instrument, above which it receives the weights used for ballasting the instrument. In the bore, F, is placed the piston, G, and from the said bore lead out four apertures, *f f f f*, which allow the internal and external pressures to be equalized, and permit of the displacement of water caused by the descent of the piston, B. The body of the instrument is filled with oil, water, alcohol, or some other non-conducting liquid through the hole, H, which the piston, G, prevents from escaping when the instrument is thrown into the sea. If there be too much liquid in the body, the piston, B, must be depressed, by which means the piston, G, will be forced down below the apertures, *f f*, through which the excess will escape. Two electric conducting wires, covered with silk, pass into the instrument through the hole drilled in the piston, B. One of these communicates with the upper ring on the cylinder, C, and the other with the lower ring. When the instrument descends, the double springs bring the two rings into connection, and thus establish the electric current. When the foot of the instrument touches the bottom, the piston, B, continuing to descend, the springs are both brought to bear upon the upper ring, whereby the lower ring is insulated, the current broken, and the signal consequently given.

137. Lumb's Squeegees; Perreaux and Co.,

This apparatus is for the purpose of cleansing ships' decks, railway platforms, boarded floors, &c., and combines the deck scrub and swab in one. The scrub is made of bristles, of an improved shape, and wears evenly all over, and the swab is formed of vulcanized india-rubber.

138. Patent Improved Field and Hospital Tents; Major Godfrey Rhodes, Unattached; Messrs. Silver and Co., 66, Cornhill, E.C.

The canvas of these tents is supported by radial ribs, composed of wood, bamboo, or other suitable flexible material. The base ends of these ribs are forced into the ground, passing through metal rings, secured at equal distances to a series of pieces of galvanised wire (which is an improvement on the endless circumscribing cord or ground rope); this galvanized wire is secured to the ground by tent-pegs. The upper extremities of these ribs are bent inwards, and then inserted within metal sockets (for the field tent, to the central wooden head-piece, only) attached to the central wooden head-piece and ridge pole. The improvements in the hospital tent are, that the ridge pole is in one length, jointed at the centre, and secured (when used) by a sliding ferule or cylinder; the ground band is made of a series of galvanized wire lengths, having metal rings attached. Interior and exterior storm ropes are attached, being in direct communication with each other. Rifle loops are secured to the canvas of the tent, whereby two rifles can be supported (together with the accoutrements of two soldiers) at each rib of the tent.



139. Military Field Surgery; T. D. Rock, 8, Napier-terrace, Wellington-street, Islington, N.

This is an arrangement for securing prompt and efficient shelter and treatment for wounded soldiers on the field of battle. The vehicle is 7 feet long, 4 feet wide, and stands 6 feet high upon its wheels; it includes two amputation boards, drawers for dry drugs, shelves for bottles containing liquids, and pigeon holes for instruments, lint, plaisters, and other medical stores. A portable stone for heating water and nourishment is fitted at the end of the carriage, with two small boots for the smoke funnels; and in the front, under the driver's seat, are two drawers for containing the medical provisions. Attached to the vehicle is a capacious tent, which affords shelter from either sun or rain, and can be used by the surgeons as a habitation. The whole of this accommodation fits compactly together, can be drawn by two horses, and in ordinary campaigning would form a good substitute for the panniered mules usually attendant upon an army.

140. Patent Travelling Rotary Cooking Apparatus; J. Radley, 22, Upper Sackville-street, Dublin.

This apparatus is intended to cook for an army on the march, while accompanying the moving columns; a hot dinner being ready to eat the moment the halt is sounded. It is stated that a stove, 8 ft. by 2 ft. 6 in., will cook for 1,200 men in 2 hours. The tanks will contain water sufficient for breakfasts for 1,200 men. The bunkers will contain two days' fuel, and the range will burn any kind. Two attendants are sufficient to work it, the wheels of the carriage turning the meat, and two horses or bullocks will draw the whole with ease.

141. Patent Breech-loading Gun; Joseph Maudslay, Westminster-road, Lambeth, S.

This invention consists in forming each piece of ordnance with an opening through the breech at right angles to the barrel, and, by preference in a vertical direction, within which opening a breech piece is moved, so as at one time to be in a position at the end of a barrel, to have its charge of powder discharged through the barrel, and at another time opposite an opening through the breech, and in position to receive a cartridge, the hinder end of the barrel being then open to receive a ball or other projectile. The back side of the passage through the breech is slightly inclined, so that the moving breech may fit closely when in position to have the charge therein fired, and yet move freely in other parts of the opening or passage through the gun. It is preferred that the diameter of the bore of the moveable breech should be less than the barrel through which the charge is fired. The hinder part of the piece of ordnance opposite the end of the barrel is solid, and forms a solid end to the moving breech when the same is brought into the position to have a charge fired. The moving breech may be moved by rack and pinion, or by other convenient mechanism.

142. Rocket Gun; Henry Reveley, Poole, Dorsetshire.

In this piece of artillery the projectile takes the shape of a rude cannon cast with a bore, the touch-hole being drilled as usual. This projectile is fired from a wrought-iron pin loosely fitting the bore, which pin is itself held in a similar cast bore, but with closer fit. In the body of the gun is a lump of cast-iron of any shape, the larger the better. A line of sight is marked

on the body of the gun, as well as across the touch-hole, on every projectile. The advantages are stated to be rapidity of discharge, because every projectile carries its own charge of powder, wad, and touch-hole, and stands ready at hand to be slipped on to the pin, requiring only to be primed and fired; safety, because each powder chamber is only used once; great economy of construction, because no turning or boring of cannon is required, as a very moderate fit will secure accuracy of aim; durability, because the pin can scarcely get damaged, and if knocked off by a shot from the enemy, can be replaced by a spare one in a few minutes. The body of the gun, being a mass of cast iron, may fairly be called indestructible. The inventor states that there is great increase of dynamic power from the explosion, because the same charge required to drive a round shot in the ordinary manner is, in the rocket gun, made to propel a mass forty or fifty times its weight. The report of a one-inch rocket gun is stated to be quite equal to that of a six-pounder fired in the usual manner, and a small charge is thus made to do the work of a larger, the form of the projectile being such as to ensure its generally going head first into the target. There is great destructive power on account of the enormous size of the projectile compared with the bore. The projectile may also be provided with a second chamber in the rocket head, carrying a bursting charge, liquid fire, or any other still more destructive material.

143. Liquid-Fire Rifle Shell; Capt. J. Norton, Rosherville.

This elongated wooden liquid-fire rifle shell, three and a half diameters of the barrel in length, is charged with a combustible liquid just before being used; the liquid, in about a quarter of an hour, will penetrate into the pores of the wood at the bottom of the shell, but not through the circumference of its body. On striking the object, a wedge-shaped plug, which closes the mouth of the shell, will be driven in, splitting the shell into many parts, each becoming a separate fire-brand, not to be extinguished by water.

144. Jacketed Rifle Bullet; Capt. J. Norton

The object of the jacket used on this bullet is to prevent the oxidising of the lead, thus preserving the shot of its requisite size, and preventing the poisoning of the wounds caused by this oxidation.

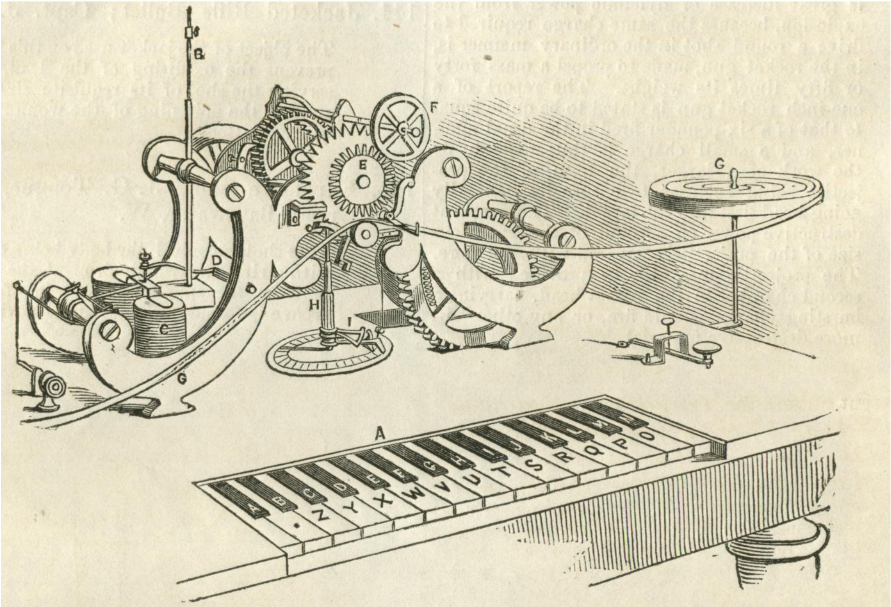
145. Expansive Shot; J. G. Tongue, Queen's-road, Bayswater, W.

This shot is conical, the body being of cast iron, with a ring of wrought iron at the lower end. Between the ring and the head of the shot a groove is formed, which is filled with lead.

PHILOSOPHICAL APPARATUS, &c.

(*For the remainder of the Articles in this Section, see Drawings.*)

156. Patent Roman-Type Printing Telegraph; Professor Hughes, 20, Northampton-square, E.C.



A. Key Board.
B. Vibrating Spring.
C. Electro-Magnet.
D. Detent.
E. Type-Wheel.
F. Ink-Roller.
G. Paper Printed upon.
H. Revolving Shaft.
I. Revolving Arm or Circuit Closer.

These instruments print any letter with one electric wave. They are governed and kept in unison by a vibrating spring, motion being produced by a weight acting upon a train of wheels. The printing apparatus is detached from the train of wheels, and only brought into action by the electric wave, which depolarizes the cores of a permanent magnet, allowing a spring attached to an armature, always resting on these cores, to rise, unlocking a detent by which the printing press is for one revolution attached to the train, and the desired letter printed. A is the keyhole; B, the vibrating spring governor producing synchronous motion; C, the electro magnet, the permanent magnet being below it; D, the detent.

157. Patent Self-restoring Telegraph Cable; Professor Hughes.

In this cable a non-conducting semi-viscid fluid is inserted between the layers of the gutta percha coatings, filling the pores, and perfecting the insulation of a good cable, while it oozes into and fills fractures of every description, whether caused by strain, chemical action, or accidents of any kind.

158. Telegraphic Cable; Captains Binney and Drayson, R.E. Woolwich, S.E.

This cable consists of a copper wire, of large sectional area, washed with a solution of pure india-rubber, over which, when dry, raw silk or wool is closely wound, and again washed over with the solution, so as to insulate the wire completely. When thus prepared the wire is enclosed in a tube of vulcanised india-rubber or other like material, large enough to leave a small air space around it. Small portions of the wire at intervals are formed into flat helical coils, by which means, combined with the elastic nature of the covering, any probable amount of extension required to meet a strain is provided for. The cable possesses great conducting power and perfect insulation, combined with only sufficient weight to allow of its sinking very gradually in the water, and a consequent absence of all risk from strain.

159. Balestrini's Telegraphic Cables; Perreaux and Co., Mark-lane, E.C.

The telegraphic wires are insulated by gutta percha, or vulcanised india-rubber, or they are enclosed in cords of hemp or other fibre, rendered waterproof by a mixture of india-rubber or pitch. The wires are thus protected from the core of the telegraphic cable; they are either laid parallel to each other, or spirally on a core of fibre, or of iron wire covered with fibre. Eight or any other number of cords of hemp or other fibre, waterproofed with the composition before-mentioned, are then closely wound in a spiral direction round this core, and the cable so formed is consolidated by passing it between grooved rollers. If the cable is intended for use under a considerable depth of water, it is strengthened by coiling round it (in the opposite direction to the coils of the cords) iron wires in long open spirals, and over these wires the cable is wound round closely with galvanised iron wire, and by the action of the galvanised wire on the non-galvanised wire a calcareous deposit is produced round the cable after it has been immersed some time, by which it is much protected. Sometimes, with a similar object, strips of zinc are laid longitudinally under the wire coating. In places where the cable is likely to come in contact with rocks it is protected by steel wire round it. To facilitate the laying of the cable a description of parachute is attached to it at intervals, which is so arranged that when the cable enters the water the parachute opens. Wires, suspended from posts or otherwise, are protected by being enclosed in cords of hemp or other fibre, waterproofed with the composition before mentioned, and afterwards painted zinc white. (See drawing, No. 423).

160. Patent Submarine Telegraphic Cables; John Walker, 17, Cowper-street, City-road, E.C.

In this cable the wire with its insulation is made, independent of the outer covering, which consists of an elastic tube of iron or steel wire. The tube is covered with wires, which run round it with a very gradual twist, so as to prevent stretching. The insulating material in some of the specimens shown is of india-rubber, coated with fine glass.

161. Platinized Graphite Battery; C. V. Walker, F.R.S., South-Eastern Railway. Robinson and Co., 226, Gresham-house, E.C.

This is a one-fluid battery, the negative plate being platinised graphite or gas carbon. The connection is made by electrotyping, soldering, and rivetting, all the copper employed being carefully tinned. The zinc plates are highly amalgamated, and stand in a little mercury contained in a small slipper of gutta percha, the liquid employed being weak diluted sulphuric acid. The advantage of this form of battery consists in its being cheap in construction and maintenance. It is stated that there is no form of battery more stable in its behaviour, more free from local action, or more fitted for standing long periods tranquil, yet always ready for action. These batteries, when once carefully charged, continue in good working order for ordinary telegraphic instruments, from six to twelve months, without any attention whatever.

162. Whitehouse's "Quantity" Battery. Robinson and Co.

A single cell of the platinized carbon battery, arranged for generating quantity, is shown. The amount of available excited surface of platinized carbon is 2,000 square inches, which can be arranged either as a single element for "one pair," or, if desired, can be in a moment divided by a glass partition and used as two pairs, each containing 1,000 square inches. The zinc plates may be removed and replaced without interrupting the action of the battery, and from the mode in which the contacts are made, the use of rivets or binding-screws for each plate is rendered unnecessary.

163. Improved Electrometer; Cornelius John Varley, 4, Fortess-terrace, Kentish Town, N.W.

This electrometer is contrived for the purpose of giving exact measures of electrical intensity, referable to a constant and easily obtained standard, so as to make observations taken at different places with different instruments comparable with each other. The instrument consists of a dial A, Figs. 1 and 2, insulated and supported

Fig. 1.

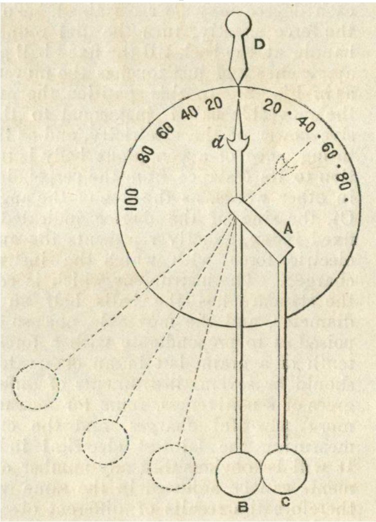
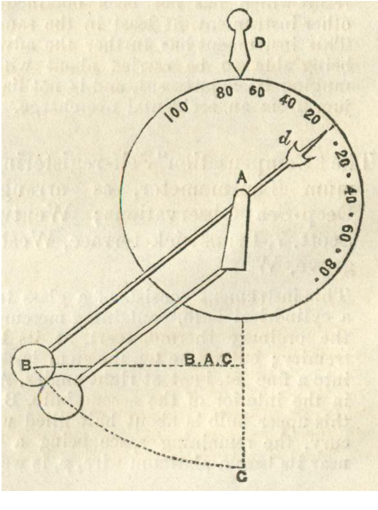


Fig. 2.



by a glass rod, and the whole capable of turning on its axis, as shown in Fig. 2. From the front of the dial two arms, B and C, are suspended, C being a fixture to the dial, and B moveable on an axis. Both these arms are terminated with balls, between which the electrical repulsion takes place when the instrument is charged. The two upper quadrants of the dial are divided, the right-hand one into 90 degrees, to measure the motion of the moveable index, and the left-hand quadrant into 100 unequal parts, to represent 100 equally increasing sines. These latter are pointed out by the fixed index D. The whole instrument is enclosed in a glass case, and all the glass supports varnished for better insulation. The mode of working it is as follows:—The instrument is to be so adjusted that when the zero on the dial plate is under the fixed index, the two pith balls hang just in contact, as in Fig 1. When the instrument receives an electrical charge, the moveable ball is repelled, as shown by the dotted lines, to distances varying with the intensity of the charge; the moveable index therefore shows, by the degree it points to, the difference of intensity in a rough way, though by experiment the exact value of each degree may be ascertained. To measure the force exactly, turn the dial round by the handle at the back till the fixed ball gradually approaches and just touches the moveable one, as in Fig. 2. In this position the gravity of the moveable ball is just equal to the repulsive power of the electricity, and as the gravitating force of a pendulous body is in proportion to its distance from the perpendicular (or, in other words, as the sine of the angle B, A, C), the sine of the degree indicated by the fixed index, exactly represents the amount of electric force with which the instrument is charged. The instrument which is considered the standard has the balls half an inch in diameter, and the moveable one so counterpoised as to preponderate with a force of one-tenth of a grain, but in an observatory there should be several instruments of different degrees of sensitiveness, some for measuring the more powerful charges, and the others for measuring the faintest electrical indications. It will be obvious that any number of instruments can be adjusted in the same way, and therefore the results of different observatories would be perfectly comparable,—an important result which has not been obtained by any other instrument, at least in the same degree. This instrument has further the advantage of being able to be carried about without deranging its adjustment, and is not liable to injury from an accidental overcharge.

164. The "Compensation" Self-registering Maximum Thermometer, as arranged for Deep-Sea Observations; Wentworth L. Scott, 7, Brunswick-terrace, Westbourne-grove, W.

This instrument consists of a glass tube, with a cylindrical bulb, containing mercury (as in the ordinary thermometer), at its lower extremity; but at the top the stem is drawn out into a fine jet, bent at right angles, A. Fig. 1; in the interior of the second bulb, B. Fig. 1, this upper bulb is about half filled with mercury, the remaining space being a vacuum; near its base a platinum wire, *p*, is welded into the glass, and bent upwards, so that its point is nearly in contact with that of the jet. It is obvious that when the instrument is "set," *i.e.* the lower bulb and capillary tube to the point of the jet, completely filled with mercury

Fig 1

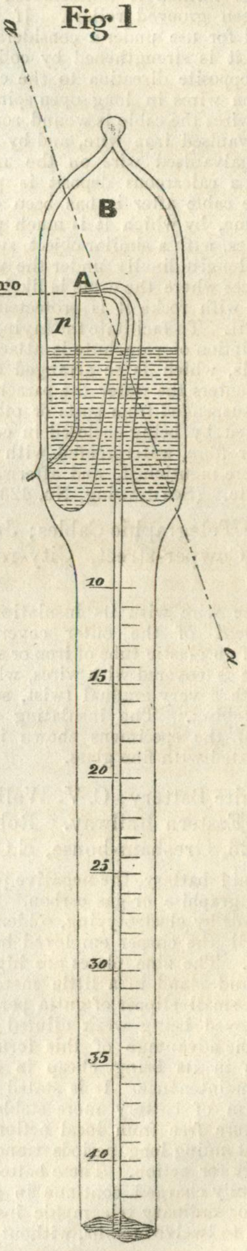
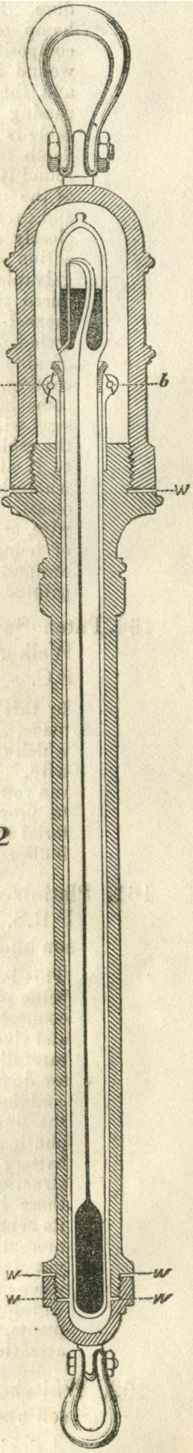


Fig 2



—any rise of temperature will expand the mercury and cause it to overflow in minute globules into the reservoir above. The platinum wire is simply for the purpose of preventing the formation of large drops at the point of the jet, by its superior attraction for the fluid metal. Upon cooling, the mercury now remaining will, of course, sink in the tube. The instrument is so graduated, that if it were cooled to 0 deg. Fahr., the level of the mercury would precisely indicate the highest temperature to which it had been previously exposed; but if the observation were made at the atmospheric temperature, the mercury would stand exactly as much higher in the tube, *i.e.*, lower in the scale—as the temperature of the air was above 0 deg. Fahr.; therefore, to ascertain the maximum temperature, it is only necessary to add to the degree at which the mercury stands, the temperature at the time the observation is made. Thus, supposing the "compensation" thermometer marks 35 deg., and an ordinary instrument by its side is at 50 deg., 85 deg. will be the highest temperature that has occurred since the last observation. To "set" this thermometer, the lower bulb must be gently raised, until the mercury runs down the tube into the reservoir-bulb; when contact has thus been established between the two portions of the metal, the reservoir-bulb is slightly elevated, care being taken to keep the point of the glass jet under the sun face of the metal (the dotted line *a. a.* in the diagram, represents the level of the mercury during this operation). The mercury will now flow back into the lower bulb, and refill the small vacuum produced by the previous decantation, when, upon restoring the instrument to its original vertical position, the tube will be full to the extreme point of the jet. It will be at once seen that vibration or agitation cannot militate in any degree against the accuracy of this instrument, no moveable indices being employed. Fig. 1 gives a view of the upper bulb, and a portion of the scale, of the actual dimensions. Fig. 2, one-third full size, shows a section of the entire instrument in a gun-metal tube for deep-sea experiments. The thermometer is "set," and inserted in the tube (into which, after greasing, a little mercury has been poured), oscillation being prevented by rings of vulcanized india-rubber, the upper one clamped by the binding screws *b. b.*; lastly, the cap is tightly screwed on, the arrangement being then ready for use. Well greased leather washers occupy the spaces at *w w*. The silver medal of the Society of Arts has recently been awarded to the inventor for this instrument. It has also been examined and approved by Rear-Admiral R. Fitzroy.

165. Spirit Levels Without Fixed Stands; R. H. Bow, C.E., 7, South Gray-street, Edinburgh.

The principle on which these levels are planned consists in such an arrangement that the observer may note at the same instant the height of the cross hair as projected against the levelling staff, and the momentary central position of the bubble in the spirit-level. The simplest form of the instrument, shown by fig. 1, differs but little in external appearance from the common pocket or workman's spirit-level, and can be put to the same uses in addition to its particular duty of affording observations by being simply held in the hand whilst looking through it. For more accurate observations other forms of the instrument may be constructed, in which a telescope with cross hair may be incorporated with the spirit-level: the most perfect of these is that shown by fig, 2, in which, by means of the very narrow reflector *r*, and the thin slice of a lens L, an image of the bubble is formed near the cross hairs, and consequently seen as though part of the landscape.

Fig. 1.

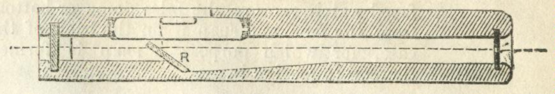
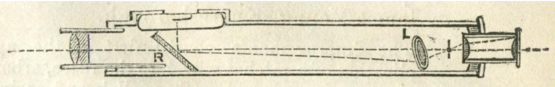


Fig. 2.



166. Dr. Page's Revolving Armature; J. W. Duffey, 13, Meredith-street, Clerkenwell, E.C.

The peculiarity of this invention consists in the use of uncovered wire for the electro-magnet, which is not only cheaper, but is stated by the inventor to allow of the introduction of a greater amount of wire in a small space without depreciation of power.

167. Improved Electric Bell; J. Sandy.

168. Apparatus for Winding Turret Clocks; Alexander Dold, Chatham.

This apparatus consists of a rod passing from the clock or other machinery through a hollow tube to a circular frame, formed by a series of vertical bars (moveable diagonally), and thence to a bearing in a dome above the circular frame. In the centre of the circle formed by the bars, the rod carries certain volants or fliers; from the disposition of the vertical bars the wind, from whatever quarter it may blow, acts upon the volants, which invariably turn in one direction, and the rod, rotating with them, gives motion to the mechanism in which it gears. This apparatus is also applicable as a motor for machinery, and for increasing the draught in chimneys.

169. Tidal Clock; Alexander Dold.

The mechanism or wheel-work only is shown, as there is no means of showing the working of the tidal power. A rod is so arranged when the clock is fixed (say at the mouth of a tidal harbour, or in or near a tidal river) that it will rise or fall with the tide. The upper part of the rod gears into the winder, and so the clock is wound up each tide without manual aid.

170. Patent Improved Watch Case; John Wells, 42, Percival-street, Clerkenwell, E.C.

The improvement consists in an arrangement whereby the open-faced watch can be readily converted into a hunting watch, or *vice versa*.

To convert the hunting-watch into an open-faced watch, remove the false dome or bottom from the face, and snap it on the back of the case, for which purpose a snap is formed thereon to receive it.

171. Improvements in Watches and Clocks; James Young, Knaresborough.

The improvements consist first in the application of a ratchet wheel to the fusee, arbor, pivot, axis or barrel with a click and spring attached to the plate. When the click is brought into action, it instantly arrests the power, and at the same time detaches the main wheel from the rest of the wheelwork, thus enabling the escapement and other wheels to be taken out and repaired, without letting the spring or weights run down. This principle is applicable to all kinds of watches and clocks. Secondly, there is an improved lever. Instead of the safety pin on the surface of the lever, the inventor places in its stead two segments of steel, which meet in the centre of the fork of the lever. When the ruby pin carries the lever back, and leaves the fork, the roller advances into the quadrant, the hollow part of the roller allowing the apex of the segment to pass, and thus, even should the banking pins be out or wanting, the escapement will not set.

172. Compass applied to the Box-Sexant; H. Swaisland, 54, Great Sutton-street, Clerkenwell, E.C.

The following are the directions for using this instrument:—Move the larger milled head to allow the index to be near the centre of the divided plate. Release the card by lifting the little dovetail between the light and compass ring; place the jointed magnifier on an angle over the top of the light; look through the sight hole to the pin at the opposite extremity of the plate to the object required; slightly raise the head, and look through the magnifier to the vernier pin of the compass; when the card is sufficiently steady, the bearing may be obtained.

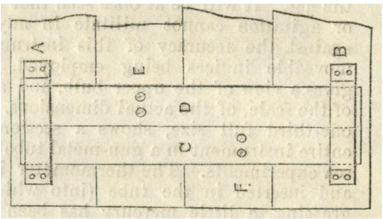
173. Patent Apparatus for Drawing Geometric Curves; Henry Johnson, Crutched Friars, E.C.

The instrument consists of a bar or upright, held in a vertical position against a plane, and furnished with a metal point for a centre. To this bar or upright is attached one end of a horrizontal rod. The upright passes through the horizontal rod, or a small block fixed upon the end of it, so that the horizontal rod may revolve round the upright as a centre. The outer end of the horizontal rod is furnished with a drum or pulley, over which a chain or band passes; one end of this chain or band is fixed to the centre upon a level with the pulley, and the other end of the chain or band, after passing over the pulley or drum, returns and is attached to a slide which carries a pencil or marking instrument. The horizontal rod is caused to revolve round the upright, and the chain or band is thus wound round the upright, each succeeding coil enclosing the preceding one, and the slide is drawn from the centre towards the pulley or drum at the outer end of the horizontal rod, by which a curve is traced by the pencil or marker progressively, increasing as it is drawn from the centre. The centre is furnished with tubes, one or more of which can be pushed down to increase the size of the centre when required. Any modification of the size or shape of the centre, or of the size of the chain will affect the curve described by the pencil. The instrument may be varied by using a boss revolving upon the upright with a slot in it, through which a flat bar passes with teeth on one side gearing into the teeth of the pinion fixed on the upright, so that as the boss revolves the bar which carries a pencil or marker is moved by the pinion; several change pinions may thus be used at different times to produce different curves; or, in place of pinions, a spiral toothed rack, decreasing in diameter from the base upwards, may be used, the toothed rack being kept up to its work by a spring.

174. Patent Apparatus for taking Accurate Views; T. Edmund Anscombe, 95, Westbourne-street, Pimlico, S.W.

This apparatus consists of a perpendicular wooden frame, and a parallel frame, with two points working up and down; a perpendicular rod, the upper point tracing the objects, while the corresponding point, holding the pencil below, transfers the object to the canvas fixed on the frame; the tracing point works upon the imaginary plane fixed in the frame; the point of sight being fixed by three rods, moving to or from the imaginary plane, to give the required scale of drawing.

175. Howlett's Drawing Board; James Newman, 23, Soho-square, W.



The ends of the clamps of this drawing board are passed through iron straps, screwed to the outer edges of the board. By this arrangement the board is held firmly to the clamps, and is stated to be free to shrink or expand, without splitting or warping.

176. Lay Figure for the Use of Artists, in Wicker-work; G. W. Scott, 43, Old Compton-street, Soho, W.

The advantages of these figures are that, being composed chiefly of wicker-work, they are extremely light, and can be easily moved about, and they are also much less in cost than the ordinary lay-figure. The joints are so arranged that they can be tightened when required.

177. Art Decoration on Mirrors; E. Agneni, 29, Devonshire-street, Queen-square, W.C.

This painting is on the back of the glass, and is thus protected from injury and decomposition.

178. Patent Reservoir Penholder; J. Ridsdale, Stoke Newington-green, N.

The reservoir is formed of vulcanized india-rubber.

179. Patent Fountain Pen; Moseley and Son, 17 and 18, New-street, Covent-garden, W.C.

180. Solid Marking Ink Pencils, for Writing permanently on Linen and other Fabrics; Arthur and Richard Dunn, 1, Dalston-terrace East, N.E.

These pencils consist of marking ink in a solid, instead of fluid form. The linen is damped before being written upon. These pencils may be used for a variety of purposes where a permanent mark is desirable, as labels for florists, &c., their exposure to light rendering the writing indelible.

181. Derogy's Patent Photographic Objective; Lloyd Chapman and Co., 196, Strand, W.C.

The objective consists, like the present portrait lenses, of two compound achromatics. When a longer or shorter focus is required, a small extra lens is placed in the middle of the tube. When used for views or reproductions, the front part of the objective with the sun shade and lens, is placed in the back end of the tube in the Camera, after having removed the lens previously there. The cap is made to be placed either upon the sun shade, or tube, when operating for Views; the focus is then lengthened or shortened, as above stated; but when a long focus is desired, the front part of the objective is replaced, as if for portraits. The diaphragms are fixed in the same place as the small extra lenses.

182. Drawing-Room Stereoscope; A. W. Bennett, 5, Bishopsgate-street Without, E.C.

183. Specimens of Non-Inverted Coloured Positives on Glass; James Newman, 24, Soho-square, W.

These non-inverted coloured positives are coloured with Newman's photographic colouring, and varnished with penetrating varnish.

184. Specimens of Machine-cut Medal Punches; C. J. Hill, Frolich Cottage, Turnham Green, W.

The machinery employed for these specimens, is stated to produce medal work surpassing in accuracy and minuteness that produced by hand. One model will suffice for the production of an unlimited number of punches varying in size, from as large as may be required to one five or six hundredth of the size of the model. If this process were used, the most rich and elaborate designs could be adopted for coins, which could be distinctly modelled on a large surface, and given without any appreciable loss in the smallest reductions, and coin struck from dies pressed from such punches would retain the proof of its genuineness till the last, by reason of the perpendicularity of the work on its surface. It is applicable for cutting hall-marking punches. A piece of work usually consumes about one-seventh of the time ordinarily required for its production by hand.

185. Geometrical Scale for Simplifying Arithmetical Calculations; J. Reed, 22, Tabernacle-row, E.C.

By means of these scales the various operations of addition, subtraction, multiplication, division, and the extraction of the square and cube roots may be easily worked. If one of the properties of a circle is known, the other remaining properties may be ascertained.

186. Patent New Compass Rule; Buss and Adkins, 21, Poultry, E.C.

This instrument is an improvement on the ordinary parallel rule, and is intended for immediately determining the bearings of two places on a chart, or for setting a ship's course, without reference to a compass on the chart, or moving the rule from its first position. Its edges are graduated, and the rule is so contrived that it revolves round a centre to which is attached a disc marked with the points of the mariner's compass; thus by the aid of a line on the upper surface, which is at once parallel with the edges of the rule, and runs through the centre of the compass disc, the ship's course or the bearings between two places may be instantly obtained. When used, it is necessary to set the cardinal points marked on the disc so that they coincide with the lines on the surface of the rule, and in such a manner that when the edge of the rule is placed on a parallel (or meridian) the N point of the disc shall be directed to the north of the chart. The finger is then pressed on its centre, to retain it in position, the rule is turned on its axis, and the edge is brought over the two places; the bearing or course can then be read from the compass disc, where it coincides with the line parallel to the edge of the rule.

187. Tangible Arithmetic for the Blind; contrived by the Rev. William Taylor, F.R.S. Abraham Pope, 80, Edgeware-road, W.

The contrivance consists of a sort of board of gutta percha, half an inch thick, and of any convenient size, the smallest being three inches and a half wide, and seven long. It contains 128 octagonal holes, into which square pegs are to be placed to represent numbers, &c. At one end there are two small projections, about one tenth of an inch high; at the other end one projection continues the whole width of the peg. These serve to show which end of the peg is uppermost, and its position in the hole. Between the holes there are saw-cuts (one-eighth of an inch deep) across the board, dividing it into as many squares. Into these saw-cuts small strips of tin are inserted, to serve as *lines* or *vincula.* They are of various lengths, and some of them have a notch near the end, on one side, and two notches on the other, and some are plain. When these tins are placed over one or more algebraical quantities, with the single notch to the left-

Fig. 1.

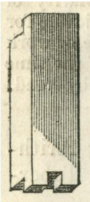


Fig. 2.

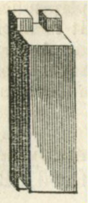


Fig. 3.

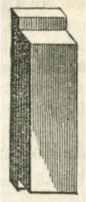


Fig. 4.

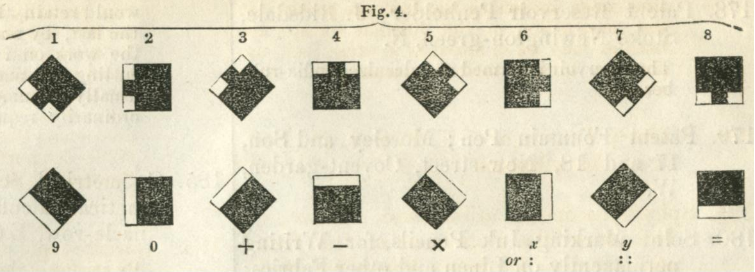
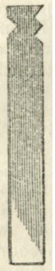


Fig. 5.



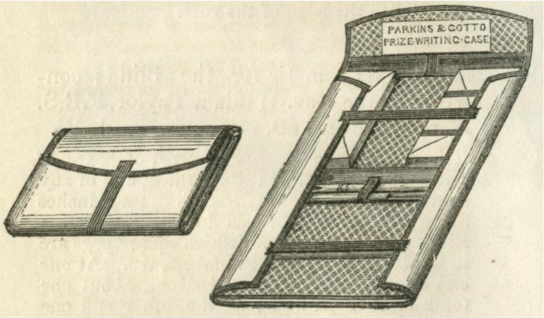
hand, it represents the *square root* of those quantities, and when the notch is to the right-hand, the *square* of them. The *cube* and its *root* are simply indicated by the *double notch*. Other tins with different notches may serve for other powers and roots. The plain or unnotched tins serve to separate fractions, &c., and for lines in common arithmetic between sums and their answers. By these means, blind persons are enabled to solve questions in arithmetic and algebra. (See *Journal of the Society of Arts*, Vol. VII., p. 328.)

188. Specimens of Geographical Modelling and Maps in relief in Papier Maché Plaster; John Brion, 7, Devonshire-street, Hammersmith, W.

These maps illustrate the application of hydraulic machinery to register printing and embossing.

189. Portable Museum of Natural Substances. Exhibited by the Collector, Thomas E. Dexter, Royal Military Asylum, Chelsea. S.W.

190. Society of Arts Prize Writing Case; Parkins and Gotto, Oxford-street, W.



The prize of twenty pounds (placed at the disposal of the Council of the Society of Arts by the Rev. F. Trench and J. MacGregor, Esq.,) and the Society's silver medal, offered for a Writing Case suited for the use of soldiers, sailors, emigrants, &c., have recently been awarded to Messrs. Parkins and Gotto, for the case exhibited. The conditions of the competition were as follows:—

1. *Weight.*—None will be received weighing above five ounces when empty.
2. *Size.*—The size in length and breadth must not exceed that necessary to hold note paper.
3. *Ink.*—The case must not contain ink in a fluid state.
4. *Durability.*—It must be made of a substance not liable to be spoiled by wet, and which will protect the contents from injury.
5. *Cheapness.*—The retail price, with guaranteed supply, must not exceed 1s. 6d.

The case exhibited is made of a waterproof material, and, when closed, is of the ordinary note-paper size. The edges of the case fold over throughout its entire length, and are retained in their position by elastic bands, similar bands being also employed for holding the envelopes, pens, &c., in their position. The case contains a blotting-book, note paper, envelopes, an indelible pencil, four pens, and a pen holder. The retail price of the case will be 1s. 6d., and the additional cost of the contents as arranged will not exceed sixpence.

191. Apparatus for the Painless Application of Cold, Electricity, and Heat as Remedial Agents, and for producing Local *Anæsthesia*; J. D. Morrison, 3, South Charlotte street, Edinburgh.

This apparatus consists of a metal cistern, which, while it admits of a current of hot or cold water being constantly circulated through it, takes advantage of the metal as a conductor of heat and electricity, so that either or both may be supplied to or abstracted from any desired part of the body for the purpose of local anæsthesia, and for avoiding hæmorrhage in operations. In an amputation of a finger, arm, or leg, all that is necessary to render the part to be operated upon insensible is simply a hollow ring, with supply and waste pipes attached to flexible tubes in connection with ice. These rings may be divided or subdivided so as to answer any operation, or to serve as a guide for the operating instruments, while describing the proper curves or lines in circular or flap operations. When used for dental surgery, metallic chambers, accurately fitting the jaw, are employed, which, by enabling a current of iced cold water to pass through them, produce speedily and certainly a state of anæsthesia.

192. Improved Lever Forceps for the Extraction of Teeth; James Joseph Cregeen, M.D., F.R.C.P., Plough-road, Rotherhithe, S.E.

This invention consists in placing the beak of the forceps to one side, so that the operator sees its proper adjustment to the tooth, at the same time much increasing the leverage power. In the construction of the different forceps, the handles may be so flexed as to cause their application to any tooth a comparatively easy matter.

193. Military Tourniquet; T. P. Salt, 21, Bull-street, Birmingham.

194. Sphygmoscopes, Cardiac and Arterial, for Indicating the Pulsations of the Heart and Arteries; Dr. Scott Alison, 80, Park-street, Grosvenor-square, W.

These instruments are intended to indicate the extent of the pulsations. When provided with flexible tubes, the glass pipes partially filled with coloured water may be brought into juxtaposition, and great facility is thus obtained for learning the relative commencement of different pulsations in different parts of the body. (See Proceedings of the Royal Society for 1856.)

195. Differential Double Stethoscope or Stethophone; Dr. Scott Alison.

This instrument is provided with two apertures for collecting different sounds at two different parts of the body at the same time, and conveying them separately to the ears. It affords an absolute test of differences of intensity of the same sound at two different parts, for a sensation is obtained in that ear only connected with the part at which the intensity is greatest. It serves sensorially to restrict sounds to the place of their greatest intensity, and is useful in dealing with murmurs of the heart. It affords a means of ascertaining the comparative power of different bodies, solid, liquid, and gaseous, as well as of different acoustic arrangements to propagate sound to an enclosed column of air. It also serves sensorially to divide sounds. (Vide Proceedings of the Royal Society, 1858, and Proceedings of the Royal Institution, 1859.)

196. The Stethogoniometer, or Chest Goniometer; Dr. Scott Alison.

This is an instrument for measuring the angles of the chest and the angles of tangents to curves. It takes cognizance of the configuration of the chest and the inclination of one plane to another in disease. (Vide the Archives of Medicine, 1858.)

197. The Hydrophone; Dr. Scott Alison.

This is an instrument for increasing the amount of sound obtained from solid bodies. It is placed at the further extremity of a hearing tube, between its aperture and the solid body. The hydrophone increases the amount of sound from solids in the case also of the naked ear—the natural hearing tube. It consists simply of a thin vulcanised india-rubber bag, partially filled with water, and has much the size and shape of a moderate sized watch. By fitting well upon the apertures of hearing tubes including the ear, the hydrophone increases the amount of sound which reaches the internal ear, for it closes the opening and confines sound like the microphone of Wheatstone. (Vide Proceedings of the Royal Society, and Proceedings of the Royal Institution, both for 1859.)

198. Kaleidoscopic Colour-top; John Graham, Tunbridge.

This invention is designed to show that when white or coloured light is transmitted to the eye through small openings cut into patterns or devices, and when such openings are made to pass before the eye in rapid successive jerks, both form and colour are retained upon the nerve of the visual organ sufficiently long to produce a compound pattern, all the parts of which appear simultaneously, although presented in succession. The instrument forms, therefore, a pleasing illustration of the law that the eye requires an almost inappreciably short space of time to receive an impression, and that such impression is not directly effaced, but remains for an assignable though very limited period. The results are obtained by rotating two discs on a wheel, the lower disc containing the colours, and the upper one the openings; this latter disc is made to vibrate as well as to rotate. thus allowing the eye to receive the coloured light reflected from below, which light assumes, at the same time, the forms of the patterns through which it has been transmitted. The instrument serves also to illustrate most of the important phenomena of colour. (See *Quarterly Journal of Microscopical Science*, January, 1859.)

199. Table-tops, Mother of Pearl, Inlaid with Metal by Electrotyping; Otto von Corvin, 50, Upper Bedford-place, Russell-square, W.C.

Ornaments are first cut out by hand or machine, after a given design, from thin plates of pearl, tortoise-shell, ivory, wood, metal, or any other suitable material. One side of these ornaments must be perfectly flat. The flat side is fastened, according to the design, on some metallic surface, for instance, a copper-plate, by means of varnish. This plate, together with the ornaments, is then submitted to the electro deposit. The metal deposited on the whole plate, on which are fastened the ornaments, surrounds and covers them. After the deposit has acquired the desired thickness it is severed, by a slight force, from the original plate, on which the ornaments were slightly fastened by varnish. This varnish gives way easily, and by turning the deposit on the right side, all the ornaments will be found perfectly inlaid in metal. This surface may now be engraved, gilt, &c., or further ornamented in any desirable manner.

AGRICULTURAL IMPLEMENTS, MACHINERY, &c.

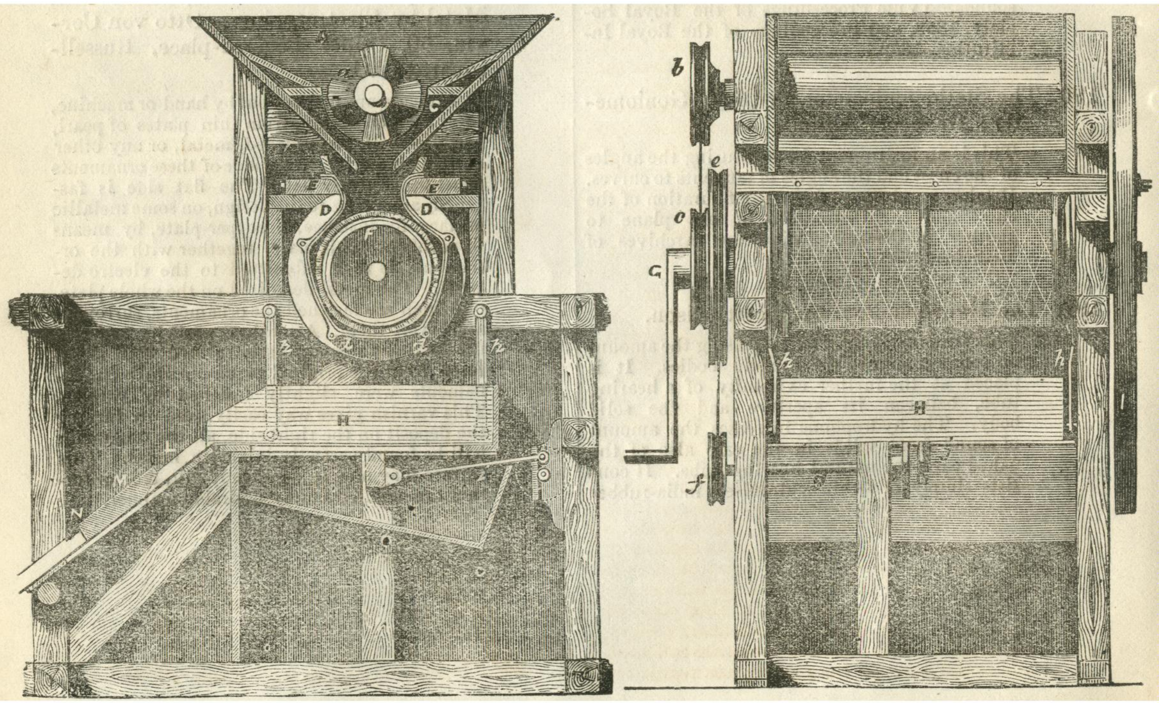
(*For the remainder of the Articles in this Section, see Drawings.*)

210. Collinson Hall's Patent Windlass and Steam Plough and Implement Gear; J. Fowler, Jun., 28, Cornhill, E.C.

The object of this mechanism is to render effective the whole power of engines used in drawing ploughs or other implements in tilling land. This is accomplished by carrying the wire rope in the form of the figure 8 round horizontal drums fixed (so as to be easily removeable) under the engines. By this arrangement the evils arising from overlaying the coils of rope when wound upon the capstan principle are avoided, as also are those arising from an unequal wear of the ordinary horizontal pulleys. In the new arrangement the solid drum is constructed with several grooves, while the other is composed of as many independent pulleys as there are grooves in the drum. The upper or lower pulley, as the case may be, revolves in one direction, while the remaining ones revolve in the opposite direction. The solid drum only is driven directly by the engine, while the pulleys revolve by frictional contact, and thus all slipping is avoided. In this gear, little or no framing is required. The axes being bolted to the bottom of the boiler, a rod or beam retains them in a vertical position. The gear may be fitted and again unshipped from an engine (by means of keys through the axes, by which the gear is retained in place) in less than ten minutes.

211. Patent Carrot Seed Bearding and Dressing Machine; J. Scott, 111, Drummond-street, Euston-square, N.W.

This machine removes the hirsute covering from carrot seed without, as is stated, in the slightest degree injuriously affecting it; but on the contrary, it is asserted that the vegetative properties of seed so dressed are improved from twenty-five to thirty per cent. The operation is effected by the use of cylinders or cones, covered with wire card metallic brushes, perforated metal, or other suitable rough surface enclosed in wire gauze casing, and capable of being regulated to suit the description of seed required to be operated on. By a slight modification it may be adapted for milling clover or trefoil, and other such like purposes.



212. Patent Britannia Self-raking Reaping Machine; B. Samuelson, Banbury, and 76, Cannon-street West, E.C.

This machine is made to cut 5 or 6 feet in width, and is drawn by two horses in advance of the near side. The action of the knife is reciprocating, the same as McCormick's, Hussey's, &c. The peculiarity in this machine is the self-acting apparatus for raking the sheaf off the platform; this is effected by means of very simple mechanism, communicating from the driving wheel to a rake-head fitted on a crank. As the cut corn falls upon the platform the rake descends upon it near the knife, sweeps it with a circular movement to the rear of the near side of the machine, and drops it in a clean bundle ready for the binder; the rake then ascends, by a turn of the crank, and traverses towards the knife again for the next sheaf. It leaves a clear space for the horses to come the next bout. The rake is completely under the control of the driver, who, by placing his foot on a lever, can suspend its action, to make large or small sheaves, or to suit the crop. The travelling wheels are large in diameter, and strongly constructed, enabling the machine to cross water courses, or run on rough bye-roads with facility and without danger of breakage. It is stated that a boy old enough to drive a pair of horses can manage it, and do from 12 to 15 acres a-day.

213. Gardner's Turnip Cutter, with apparatus enabling various sizes to be cut with the same knives; B. Samuelson.

This is an improvement on the well-known double-action turnip cutter. It has thirty cranked knives projecting from the surface of a hollow cylinder facing in one direction, and two slicing knives extending from end to end of the cylinder facing the other way, so that small pieces for sheep, or slices the whole width of the root, may be cut according to the direction in which the cylinder is turned. The patented improvement consists in using plates of various thicknesses and shapes; these are bolted to the space in front of the knives, and, in some cases, upright knives are used to subdivide in width. The plates are easily fitted to or detached by the most ordinary labourer. The object of the invention is to enable the same machine, besides its usual purpose of cutting finger pieces for sheep and slices for cattle, also to cut thin slices for young calves and very small strips for lambs, or for mixing with straw, chaff, meal, bran, &c., for cattle.

214. Patent Fumigator and Mildew Annihilator; E. Spary, Queen's Graperies, Brighton.

Figs. 1 and 2 represent the elevation and section of the larger apparatus, to be heated by charcoal or coke, wherein the top of the receiver is sealed down, and a pipe fixed on the top to convey away the fumes through a flexible hose to the spot required; or, where pressure is necessary to drive the fumes through a long pipe, an hydraulic holder is added, with tank, pulleys, and weights. Into this the fumes are collected, and forced through the pipes by the regulating weights placed on the top. The larger apparatus is generally used outside the building.

Fig. 1.

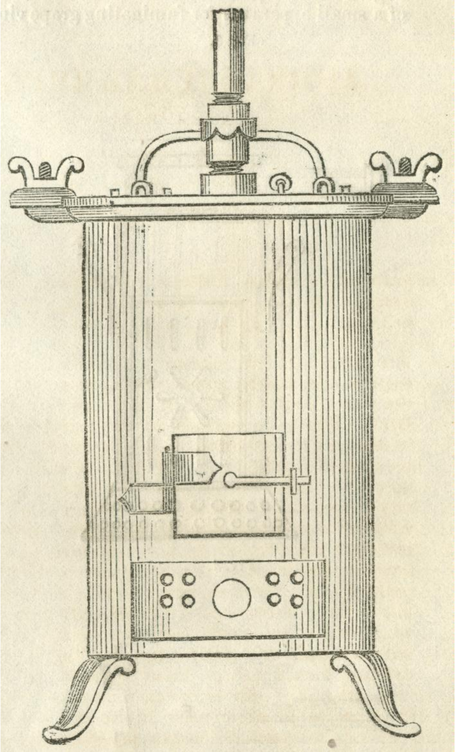
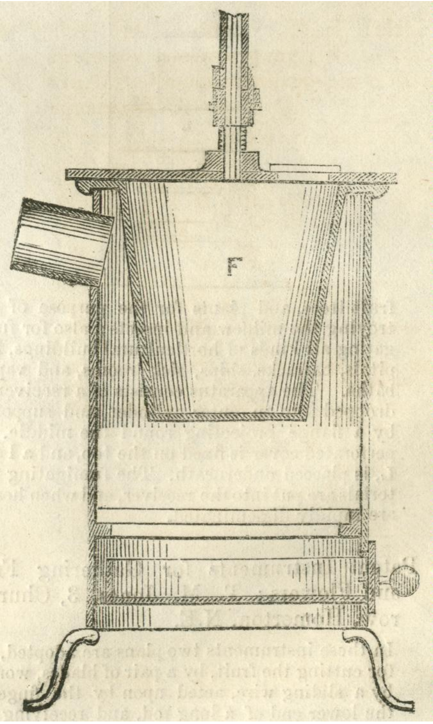


Fig. 2.



215. Patent Fumigator and Mildew Annihilator; E. Spary.

Figs. 3 and 4 represent the elevation and section of a small apparatus for fumigating grape vines,

Fig. 3.

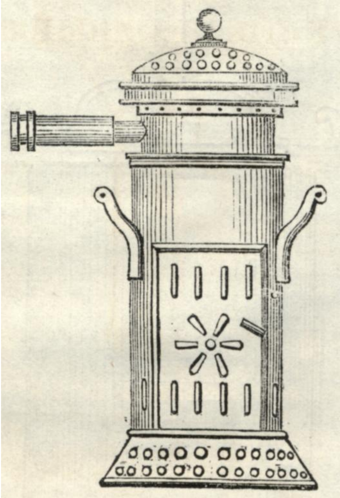
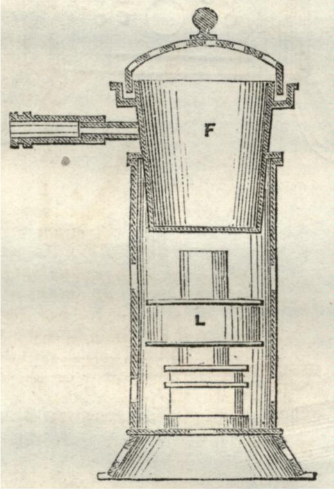


Fig. 4.

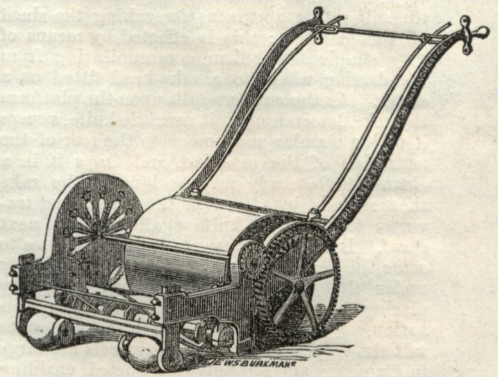


fruit trees, and plants for the purpose of destroying the mildew and insects; also for fumigating all kinds of horticultural buildings, hospitals, barracks, ships, sick rooms, and vapour baths. The apparatus consists of a receiver, F, dropped into an outer cylinder, and supported by a flange projecting round the middle. A perforated cover is fixed on the top, and a lamp, L, is placced underneath. The fumigating materials are put into the receiver, and when heated are rapidly disseminated.

216. Patent Instruments for Gathering Fruit and Flowers; T. M. Jones, 3, Church-row, Homerton, N.E.

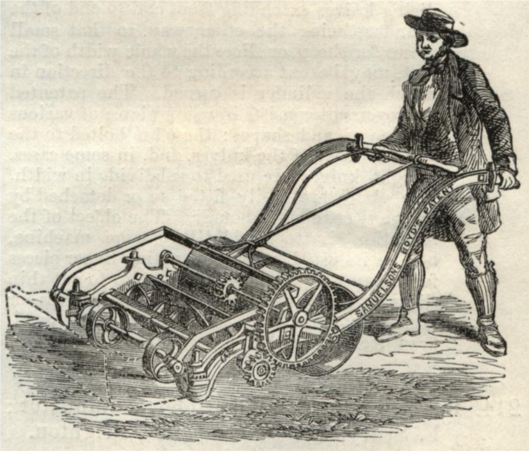
In these instruments two plans are adopted, one for cutting the fruit, by a pair of blades, worked by a sliding wire, acted upon by the finger at the lower end of a long rod, and receiving the fruit in a net; and the other for gathering it by holding it firmly, but without injurious pressure, between two discs of vulcanised india-rubber, mounted in frames worked in a similar manner.

217. Patent Lawn Mower; Picksley, Sims, and Co., Leigh, near Manchester.



In this mower the wheels are encased, so that no grass or branches of shrubs can come in contact with them. It will mow on undulated ground or hill sides, and can be either drawn or pushed. It runs on balls in front of the machine, working against friction-balls inside of cups, which enables it to turn right and left, or in any other direction. The cutters are raised and lowered by a rack and pinion motion, so as to cut any length of grass.

218. Boyd's Patent Lawn Mowing and Rolling Machine; B. Samuelson, Banbury, and 76, Cannon-street West, E.C.



The improvements consist in adapting a brush which is so placed that the edges of the knives come in contact with it as they revolve, and are thereby kept clean, so as to enable them to cut the grass wet or dry. The arrangement for raising and lowering is regulated instantaneously, and without a possibility of lowering or raising one side more than the other. The machine rolls at the same time the whole width of the grass cut.

219. Permanent Observatory Bee Hive; W. B. Tegetmeier, Muswell-hill, N.

This is a bar and slide hive, having each side formed of four parallel plates of glass, with spaces of air between. This construction is stated to render the hives so perfectly non-conducting that the warmth of the bees is retained even in winter, and the hives do not require to be covered over with any opaque material; hence the actions of the bees are always open to observation, without their being disturbed by the sudden and unexpected admission of light.

220. Patent Garden Engine, also applicable to Fire or other Engines; Thos. G. Messenger, Loughborough.

This invention consists in placing two brass cylinders horizontally, in which two pistons work by one piston-rod; between the cylinders is placed a valve-box, containing four valves, one for each cylinder, opening inwards, and one outwards into an air chamber, from which a tube is carried to the top of the tub in which the engine is fixed, and mounted with a brass branch pipe with universal joints and a double spreader, so as to answer the purpose of either jet or rose. The engine is worked with a long lever. To prevent the water passing from one cylinder to the other, a stuffing-box is placed in the valve-box through which the piston-rod works.

221. Green's Improved Box for Floriculture; J. Collins and Co., Lett's-wharf, Waterloo-bridge, S.

This box allows free access of air and of nutriment to the root of the plant. Water or liquid is supplied through a tube, and the fibres of the roots take up what they require, and the surplus of moisture is then drawn off at the other end of the frame, in place of being allowed to remain and rot the lower fibres of the plants. The box being perforated, free circulation of air about the roots is permitted.

222. Patent Garden Syringe; W. Palmer, 156, Western-road, Brighton.

In this syringe there is a finely-perforated strainer placed within a case, having a stop valve in connection with it.

223. Glenny Watering Pot; Loveridge and Shoolbred, Wolverhampton.

From the peculiar construction of the handle of this watering pot, the weight is more easily balanced in the hands.

224. Patent Horse and Cattle Fastening; G. W. Baker, Park-farm, Woburn.

The object of this invention is to facilitate the release of cattle in case of fire. By its means, a single person, without even entering the building, has the power of releasing a whole shed of animals at one and the same time. Fig. 1 is a view of the Cattle Fastening as fixed when a beast is attached. Fig. 2 is a view of the same opened, as when the animals are released. This is done by means of a lever at the end of the building outside, which, when pulled, opens all the fastenings simultaneously, being connected with each one continuously by ordinary iron gas piping of ¾-in. diameter. The animals are thus released with their ties on, which is a great advantage, as they can then be led away to any convenient place and tied up, instead of being turned loose into the country. The fastenings intended for horses are made shorter.

Fig. 1.

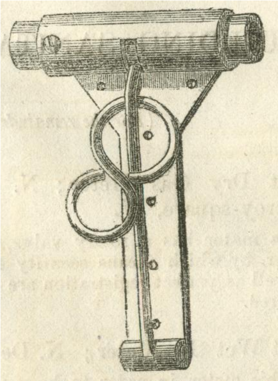
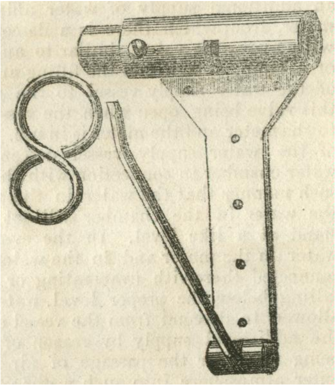


Fig. 2.



225. Patent Fish Manure; Samuel Osler, 12, Brighton-terrace, Great Yarmouth.

In the preparation of this manure, fish is subjected to a prolonged heat of about the temperature of boiling water, the watery portion separating from the fibre with the gelatine and oil; the whole substance of the fish being resolved into three parts, the fibre and bone, which remain in a comminuted solid, constituting the manure, and containing the ammoniacal constituents of phosphates; the gelatine being dissolved in the water, and the oil floating on the surface. This is skimmed off; and the water, with the gelatine in solution, is separated, and the fibre that remains is dried for manure. The water, with the gelatine of the fish, may be evaporated for fish glue, or inferior isinglass; otherwise it may be used for liquid manure.

BUILDING, SANITARY, AND DOMESTIC APPLIANCES.

(*For the remainder of the Articles in this Section, see Drawings.*)

236. Patent Dry Gas Meter; N. Defries, 5, Fitzroy-square, W.

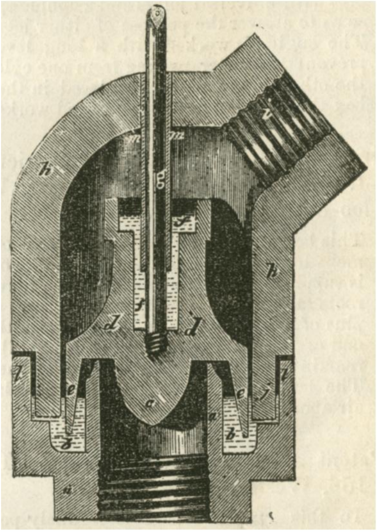
This meter has a rotary valve, with leather cover, by which means security from leakage as well as perfect registration are stated to be secured.

237. Patent Wet Gas Meter; N. Defries.

In this meter, in order to keep up the water to a constant level, there is a vessel containing an additional supply of water affixed to the meter, from which there is a descending pipe with a covering valve, similar to an oil vessel of a lamp, to facilitate the filling and refixing of the water supply vessel to the gas meter, this valve being open when the vessel is fixed to the meter and the meter is in use. The pipe of the water supply vessel descends into a water chamber in connection with the meter in such manner that the water in the meter and the water in the chamber will at all times stand at a like level. In the event of the water in the meter and in the water chamber connected therewith evaporating or otherwise falling below the proper level, water will be allowed to descend from the vessel containing the additional supply by reason of provision being made for the passage of air from the outer atmosphere into such water vessel when the meter falls too low, but the flow of air from the atmosphere into the additional water supply vessel is shut off as soon as the proper water level is obtained in the meter.

238. Patent Safety Gas Valve; J. T. Willway, 29, St. Augustine's-parade, Bristol.

This valve is designed to facilitate the turning off and on of the gas in private houses, shops, &c. The ordinary main tap, owing to its position, is frequently so difficult to get at, that the gas is in many cases allowed to remain constantly in the pipes. With this apparatus the gas may with the greatest ease be turned off or on at any part of the building. The valve is represented in section in the accompanying woodcut. *a*, is a neck or collar into which the mouth of the gas supply tube screws, and which rises inside so as to form a cup, *b*, in which is placed mercury, or a ring of india-rubber. The collar, *a*, receives the cone, *c*, forming part of the valve, *d*, which has also formed on it the ring, *e*. This ring, by entering the mercury, or descending tightly against the india-rubber, forms a sealed joint. *f*, is a second cup, for containing mercury, and *g*, is a rod rising from it. *h*, is the cover in which is the aperture, *i*, for the passage out of gas to the burners or elsewhere. The bottom part, *j*, of this cover enters the mercury in the cup, *b*, while at the joint it rests upon the upper rim, *l*, and the parts are held together by screws through lugs at the side. From the top of the cover, *h*, descends the pipe, *m*, through which the rod, *j*, passes, and which dips into the mercury in the cup, *f*, to prevent the escape of the gas. By raising and lowering the valve, *d*, by means of the rod, *g* (which may be conveniently done from a distance by attaching it to a peculiar pneumatic apparatus, similar to that used for the atmospheric bell), the supply of gas through the outlet, *i*, can be shut off, fully opened, or regulated at will. (See *Mechanics' Magazine*, April 10th, 1858.)

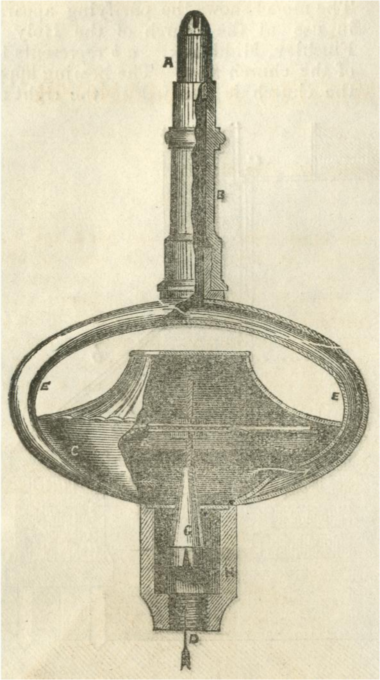


239. Clibran's Patent Gas Governor for Street Lamps; Charles Esplin, 20, Saville-place, Lambeth, S.

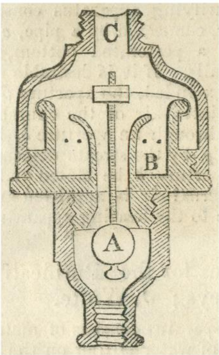
This invention consists of a small gas holder, sealed by mercury, and so arranged as to regulate the pressure.

240. Patent Street Lamp Regulator; J. B. Paddon, Gray's-inn-road, W.C.

In this regulator the gas immediately acts upon a diaphragm, which has a conical valve attached to its centre, and as the pressure is high or low, this valve contracts or enlarges the aperture through which the gas passes. By the application of a magnet to the bottom of the valve working in a soft iron case a graduated force without friction is obtained, which compensates and controls the otherwise irregular action of the diaphragm, and secures a uniform supply of gas to the burner, whatever may be the variation of the inlet pressure. (See *Mechanics' Magazine*, Nov. 13, 1858.)



241. Geyelin's Patent Gas Burner Regulator; Joseph Boulton, 28, Bagnigge Wells-road, W.C.



In this regulator a diaphragm of flexible material is placed below the burner. This diaphragm is weighted so as to modify the pressure of gas, as required.

242. Patent Economising Gas Burner; H. W. Hart, 69, Fleet-street, E.C.

Between the burner and the supply pipe a conical chamber is formed, containing a woollen wad, between two perforated plates of metal. The gas, in its passage from the supply pipe to the burner, expends its force upon the wad, and passes slowly through the wool, giving a steady supply to the burner.

243. Mediæval Gas Standard; Hart and Son, Wych-street, Strand, W.C.

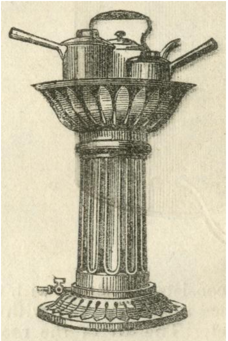
244. Patent Chandeliers; John B. Smith, 2, Grosvenor-place, Lodge-road, Birmingham.

The object of this chandelier is to do away with the hitherto ordinary method of raising and lowering by means of the hydraulic tube and balance weights; instead of which is used a quick-travelling internal screw, by means of which the chandelier can be raised or lowered as required. The advantages of the invention are that it prevents accidents arising from the breaking of the chains to which the weights are attached; and it dispenses with the necessity for using water to prevent the escape of gas, as, when once fixed, it requires no further attention, being perfectly air-tight. It can also be advantageously adapted to glass chandeliers, which have hitherto not been capable of being raised or lowered. This is shown in one of the specimens. The glass chandelier exhibited revolves from the centre; the metal chandelier is worked by means of the handle at the bottom attached to the screw.

245. Patent Light and Heat Generator, or Economical Gas Stove; Syson Nibbs, Birmingham.

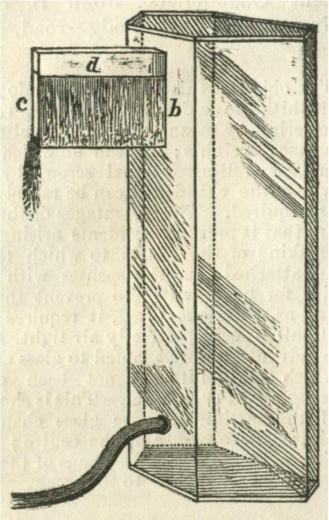
The object of this invention is to economise the amount of gas usually employed in heating a gas stove, and render it available for light. The arrangement of the gas burners is such as to give a good light, which is refracted through a thick globe of glass, and the upper portion of the apparatus encourages a great amount of heat, which is radiated from a polished surface. The top can be removed to admit of its use as a cooking apparatus. A small room may be warmed by the simple application of a lamp where gas cannot be had.

246. Gas Cooking Stove; F. A. Kukla, 194 Pentonville-road. N.



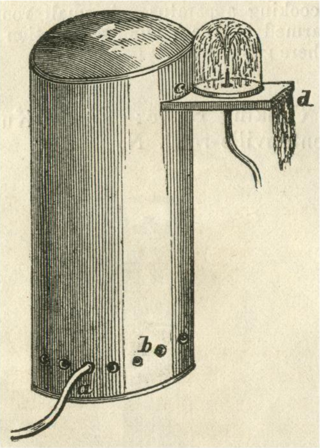
This is a small pillar stove, with an arrangement for heating cooking vessels at the top by inserting them in holes in a hob plate. The inventor states that it will cook for six or eight persons.

247. Gas Stove for Warming and Lighting, with Apparatus for Purifying the Air of an Apartment ; J. White, Finchley, N.



This apparatus consists of a glass case, in which gas is burnt, to which air is admitted from the apartment, and also, by means of an aperture, connected by a tube with the external air. The air passes upwards through the stove, and through the channel *b*, *c.* ; being purified in its passage by water percolating from the vessel *d*.

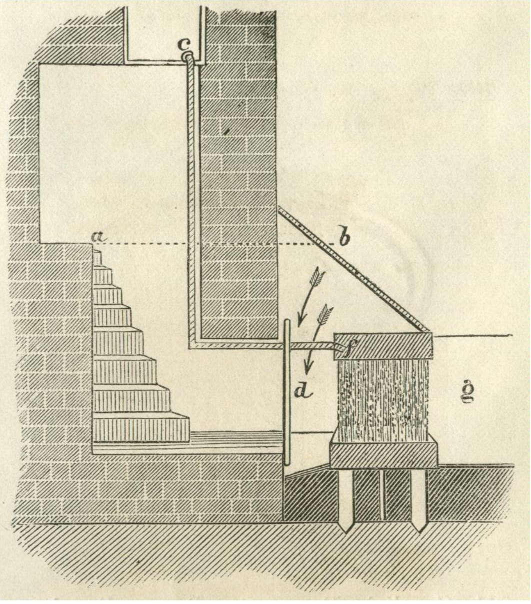
248. Stove, with Apparatus for Purifying Air ; J. White.



This consists of a stove, with or without a flue, enclosed in an iron case, with which it is not in contact. The air of the room is admitted to the outer case and to the stove by the apertures *b* ; and the external air admitted to it by a tube communicating with the case at *d*. The air in the case (mixed with the products of combustion when there is no flue) passes upwards through the channel *c d*, where it is purified by the water of the fountain.

249. Apparatus for the Purification of Air in Large Buildings ; J. White.

The model shows the purifying apparatus now in use at the church of the Holy Trinity, Finchley, Middlesex. *a b* represents the level of the church floor. The heating apparatus of the church is situated to the right of *g*, in a channel along which all the air passes before entering the church ; and the purifying apparatus is situated at the entrance of this channel. The purifying apparatus consists of a tank of water *c*, connected by a pipe, *c f*, to a vessel *f*, having a perforated bottom, through which water falls. If it is desirable that the external air be excluded, the aperture *d* is closed, when the vitiated air of the church, passing downwards through an aperture *b*, is purified on its road to *g*, by the stream descending from *f*. If the apperture *b* be closed and *d* opened, then the external air is admitted and purified in its passage to the heating apparatus *g*.



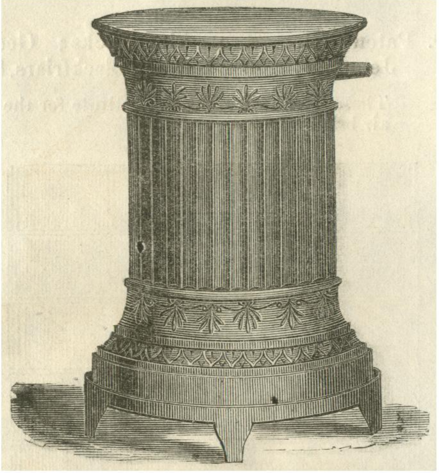
250. Apparatus for the Purification of Air in Chimneys ; J. White.

This apparatus consists of metal plates, with a supply of water falling on the upper plate, and from the upper successively to all the plates to the lower, from which it is conveyed by a pipe. It is placed in the lower part of the chimney ; and the plates are so arranged that the air, mixed with the smoke and products of combustion, in its ascent passes through the waterfalls, and is by that means purified. Or the apparatus may be placed at the top of a chimney, outside the house, when a supply of water is provided for that height.

251. Patent Hygeian Stove ; J. E. Ryffell, Wimbledon, Surrey, S.W.

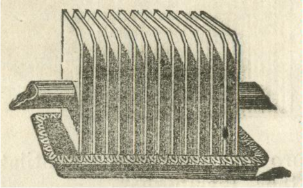
This stove is of cylindrical form, 34 inches high, and 12 inches in diameter. It consists of an outer and an inner cylinder; at the top is a baking tin, resting with its foot on the lid of the inner cylinder. The outer cylinder is hermetically closed at the top by a sand-groove, and there is a rod by which the admission of the outer air into the outer cylinder is regulated; the inner cylinder contains the fuel. It is stated that this stove will burn about twenty-four hours at a cost of one penny, and when lighted requires no further attention. It can also be used as a baking oven.

252. Patent Earthenware Stove; John Roberts, Terra Cotta Works, Upnor, near Rochester.



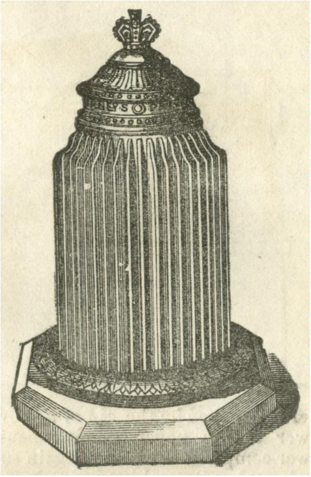
This stove may be made either of fire-clay, iron, or earthenware lined with iron. The fuel burnt in it is stated to be smokeless, and will give a continuous heat for 20 hours or more without any attention. The atmosphere heated is perfectly healthy, sweet, and safe to sleep in. The thermometer seldom varies more than two or three degrees during 24 hours. They are well adapted for nurseries, conservatories, &c. One peculiarity of the fuel is, that it retains its shape after combustion, and, with the addition of another chemical, forms guano. The cost of the fuel is 1s. 6d. per bushel, and the residue of the combustion is valued at 6d. per bushel.

253. Gurney's Patent Improved Hot-Water Pipe; London Warming and Ventilating Company.



This apparatus consists of a steam or hot water pipe, made with a series of transverse wings on flanches in one solid casting, so as to secure a rapid transmission of heat to the extreme edge of each wing.

254. Gurney's Patent Stove; London Warming and Ventilating Company, Limited, 36, Great George-street, Westminster, S.W.



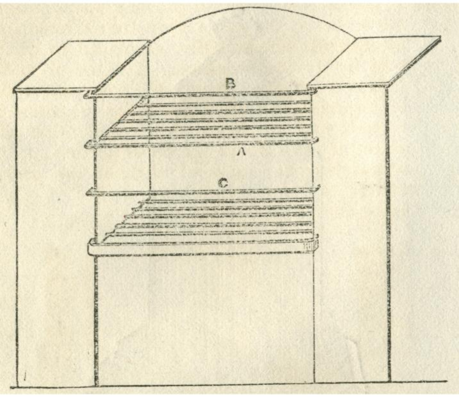
This stove consists of a plain interior cylinder, with a series of perpendicular radiating wings. The stove is placed in a pan of water, regulated to produce the required amount of evaporation. The vapour passes, in conjunction with an ascending column of air, over the external surface of the stove, rising up between the wings, and by this means prevents the stove from being overheated, the air from being "burnt" or overdried, and, under the laws of convection, is stated to cause a rapid intermixture, even when the stove is placed at the extreme end of an oblong room.

255. Patent Smokeless Grate; William Young, 33 and 34, Queen-street, Cheapside, E.C.

In this invention the coals are introduced at the bottom of the fire, under the ignited embers, so that the whole of the gases given off are burned. The apparatus by which the coals are introduced into the fire consists of an iron tray fixed to the lower portion of the front of the stove. Along this, is a right and left-handed Archimedean screw. When the fire is to be fed fresh coals are placed in the tray on the top of the screw, which is then turned by a ratchet work moved by the poker. By the revolution of the screw the burning embers are raised up, and fresh coals deposited in the cavity underneath. —(See *Mechanics' Magazine*, March 4, 1859).

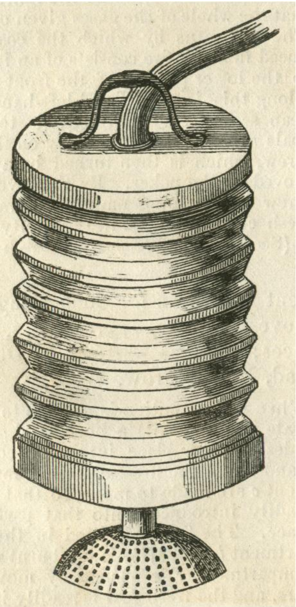
256. Patent Invention for Consuming Smoke in Stoves, Grates, Fire-places, and Furnaces; Thomas Bartlett, M.D., 7, King's-road, Bedford-row, W.C.

When this invention is applied to an ordinary grate (see woodcut) a horizontal grating *a* divides the fire-place into two compartments, *b* and *c*, and the fire-bars of the lower compartment *c* are made to move, so that coal may be readily introduced into that part of the fire-place. The fire is lighted in the upper compartment *b*, and after it has burnt up, the lower compartment *c* is opened by moving its fire-bars, and the fresh fuel is readily introduced by an ordinary fire shovel into the lower compartment. When the fire needs replenishing, the lower compartment *c* is opened, the well ignited fuel is removed by the aid of a shovel from the lower to the upper compartment, and the lower compartment is then again supplied with fresh coal. By making a side-hopper, or fuel-chamber, the fuel is readily introduced from the top, and in that case the fire-bars need no alteration. By making the bars of the horizontal grating hollow, and by causing a stream of water to pass through them, as in the larger model, this invention can be applied to any kind of furnace. (See *Leader*, Jan. 29, *Mining Journal*, Feb. 12, and *Builder*, Jan. 22, 1859.)



257. Apparatus for Purifying the Air of a Sick Chamber, or other Apartment; J. White, Finchley, N.

This apparatus consists of bellows, with valves at the top, opening inwards, and an aperture at the base connected by a pipe with a perforated metal plate. The air drawn into the bellows is forced downwards into a vessel of water placed beneath the bellows, and is diffused in the water by the metal plate. After purification by the water, the air passes into the room.

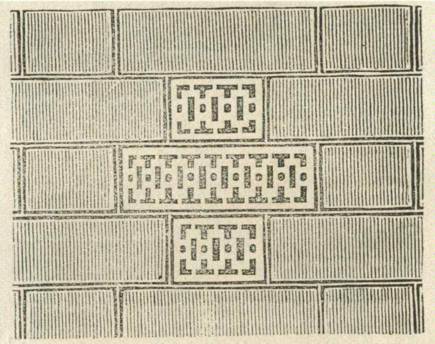


258. Apparatus for Propelling Purified Fresh Air into Buildings; J. White.

This apparatus consists of a bellows similar to that last described, with the addition of a covering, which forms a closed air-tight cavity on the surface of the water. A tube connected with this cavity conveys the purified air from the apparatus through the wall or other part of the building.

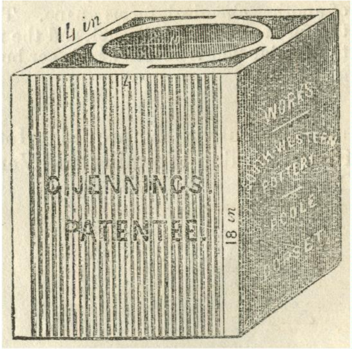
259. Patent Stoneware Air Bricks; George Jennings, Holland-street, Blackfriars, S.E.

These bricks are a cheap substitute for the iron air brick.



260. Patent Stoneware Bonding Bricks for Hollow Walls; George Jennings.

261. Patent Terra Cotta Smoke Fluepipes, with junctions for the passage or escape of impure air; George Jennings.

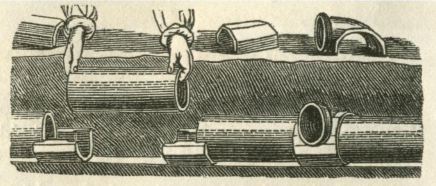


262. Improved Universal Ventilator; Syson Nibbs, Birmingham.

This ventilator contains a valve, which is regulated by a chain, with a cap and cover, to prevent down-draughts. It may be made of any size, for rooms, ships' cabins, or railway carriages.

263. Patent Stoneware Drain-pipes, with Chairs and Saddles; George Jennings, Holland-street, Blackfriars. S.E.

The woodcut shows the application of junctions to finish lines of drainage, without in any way disturbing the invert or general line of drain.



264. Patent Improved Invert Blocks; Henry Doulton and Co., High-street, Lambeth, S.

These blocks are connected by a lip, or proprojection, which unites them firmly together, and prevents the sewage from entering the lower channels, which are thus kept quite clear for land drainage.

265. Patent Combined Smoke and Air Flues; Henry Doulton and Co.

In this arrangement the air flue follows the line of the smoke flue, the passages being quite distinct. The heat from the smoke-flue causes a current, which carries off the vitiated air admitted by junctions near the ceiling. The pipes or blocks are all made to bond with ordinary brick-work. Where the blocks come together, each air-flue has a lip or projection, which enters the next block and completely shuts off the air-flue from the smoke-flue at the joint. This lip, with dowels at the opposite corners of the blocks, also holds the lengths firmly together. The smoke and air flues are made curved to suit any inclination.

266. System of Drainage; Edward Jones.

The various features of this system are as follows:—1. A drain and man-hole with tank. Filtering and deodorising apparatus, whereby the sewage is collected and a means provided for ventilating the sewers. 2. A gully trap and tank for collecting the débris of the streets, and preventing the effluvia from escaping; also area and yard traps, by the use of which the effluvia is stated to be prevented from entering the dwelling houses. 3. A closet pan, and traps with filtering tank, adapted for all water closets.

267. Patent Imperishable Stoneware Sockets; Benj. Looker, Kingston-on-Thames, S.W.

These sockets are composed of stoneware, the exterior being glazed. Each socket is made with a foot, or enlargement at the lower end, and the bottom is closed, so as to prevent any moisture from passing up from below into the interior of the socket. Fig. 1 represents a longitudinal section of this socket for receiving a telegraphic or other post; and Fig 2 is an exterior view of the same. It is made in three parts, *a*, *b*, and *c;* the lower part, *a*, is closed at one end, and has a foot formed to it; and at its other end is a socket to receive the lower end of the piece *b*, which also has a socket at its upper end to receive the end of the piece *c*. By constructing the socket in different parts in this manner, it is easier to fix the upright or post into it. It may, however, be made in one or any number of pieces. In order to prevent water entering the socket at the joints, they are rendered tight by cement, which is also employed to fix the post firmly in the socket. The use of sockets of this description protects the post from rotting off, especially at the point where it enters the ground, which is the part where decay first takes place; for this reason the upper portion *c*, of the socket may be employed without the parts *a* and *b*.

Fig. 1.

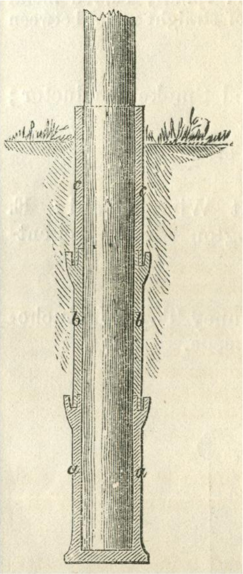
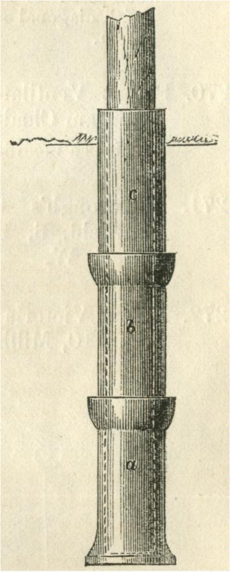


Fig. 2.



268. Patent Socket Footings; Benjamin Looker

These footings are made on the same principle as the patent sockets for telegraphic posts, &c. They are composed of stoneware, the exterior being glazed, the object of the introduction of these footways, is to supersede the use of brick or concrete foundations, and the ordinary stone footings to timber uprights. In figure 1 is shown a longitudinal section of the patent socket footing, and fig. 2 represents an exterior view. The socket footings are strengthened by having ribs in the interior or exterior, or both. They are made of various dimensions, to suit different sizes of uprights. It is intended that about 6 inches of the socket part of the footing

Fig. 1

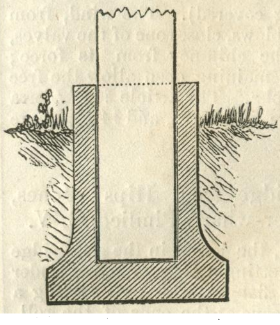
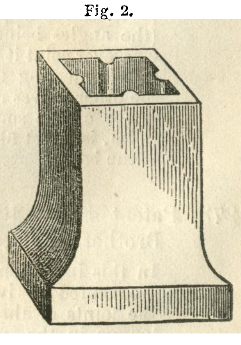


Fig. 2.



should be above ground, in order to prevent the timber from rotting off at the point where decay invariably takes place first. The uprights may be fixed in the socket with cement.

269. Patent Ventilator and Smoke Conductor; William Chadwick, Albert Works, Bury, Lancashire.

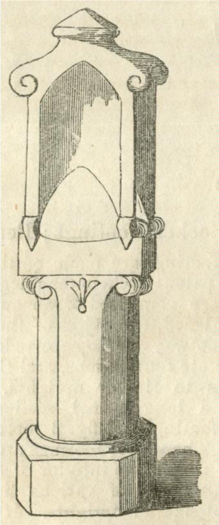
Within the chimney pot are placed two blades of a screw, similar to those of a marine screw-propeller. These are made to rotate by the action of the wind on a peculiarly formed cowl, composed of strips of spirally curved metal with diagonal strips of straight metal between them.

270. Patent Ventilator and Smoke Conductor; William Chadwick.

This is a modification of the above.

271. Bidborough's Patent Wind Guard; E. Corfield, 6, Burlington Mews, Regent-street, W.

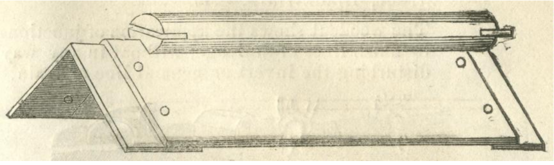
272. Patent Victoria Chimney Top; J. Zucheroni, 10, Millhill, Leeds.



This apparatus is divided at the top into four parts. In each part there is a moveable valve (the angles being covered). The wind, from whatever point it blows, closes one of the valves, thus protecting the chimney from its force; the other valves remaining open allow the free escape of the smoke. The article is of Terra Cotta, is 3 feet 6in. in height, and 14in. square at the base.

273. Patent Slate Ridges and Hips; Jones, Brothers, Bangor-wharf, Pimlico, S.W.

In this invention, the joints in the slate ridge are secured by rivetting a piece of metal under the joints of the flanges, and by inserting a tongue in the groove at the ends of the roll, thereby rendering the whole as perfect at the joints as at any other part.



274. Patent Waterproof Carton; P. M. Parsons, 9, Arthur-street West, London-bridge, E.C.

This is intended for roofing sheds and temporary buildings, and for lining damp walls, and is stated not to be affected by the hottest sun.

275. Specimens of Veneers Adapted for Fixing in Plaster Walls; the London Parquetry, Victory Works, Camberwell, S.

These specimens are veneered on cement, and may be applied at much less cost than the ordinary pannelling. They offer no inflammable body in case of fire.

276. Specimen of Wood Carving by Machinery; Cox and Sons, Belvedere-road, Lambeth, S.

This specimen consists of a bench-end with poppy head, showing three styles of carving to which the machine is applicable, viz.:—Cutting the tracery, which can be done from an outline pattern; working the crooked moulding round the outside edge of the bench, and carving the natural foliage in the poppy head. The specimen sent shows the amount of work that can be done by the machine, no hand-labour having been employed.

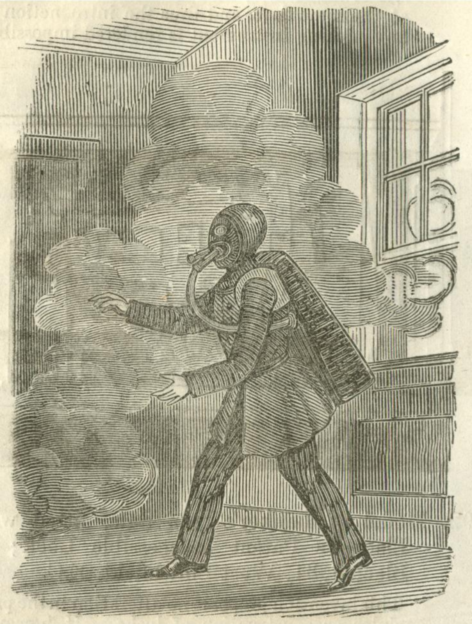
277. Specimen of Fret Cutting by Perin's Band Saw Mill; A. R. Perry, 20, John-street, Pentonville, N.

278. Telescopic Fire Escape, with Traversing Platform; John Bainard, Coventry.

By means of winches, the escape is elevated and the platform is then turned round to the window or roof of the house, so that a great number of persons may get on to it, and be lowered one by one by means of the basket.

279. Apparatus for Facilitating Respiration in the midst of Smoke and Noxious Gases; J. White, Finchley, N.

This apparatus consists of a mouthpiece of metal fixed to an air-proof head dress, descending round the neck, where it is to be closely enveloped by the ordinary clothing to prevent the access of smoke or gas to the lungs. Two pipes, with valves for breathing, are connected together at one end, and can be fixed to the mouthpiece. The inhaling pipe is in connection with a vessel of air which is to be attached to the body; the exhaling pipe is in communication with the surrounding air. The whole body and apparatus, when exposed to fire, may be enveloped in a loose dress of woollen fabric, saturated with water.



280. Patent Self-cleansing Water Cistern and Filter; James Rae, 1, Alpha-road, New Cross, S.E.

This invention renders it possible to scour the sides and bottom of the cistern every time the water comes in from the main, as the supply pipe extends to the commencement of the conical bottom, being turned round to form an angle of 45 degrees, thus creating a circular motion, which carries off the organic matter which adheres to the sides of the cistern. From the conical form of the bottom, the whole of the sediment descends to the lowest point, and is carried off by a pipe. The filter, which is also self-cleansing, is placed inside the cistern, and takes its own supply. It may be constructed as follows:—Instead of passing the water through a sponge in the top, the top is made close, and the water is allowed to rise up through the filtering matter into a chamber placed on the top of the filter. This obviates the necessity of changing and renewing the sponge, and the filter is said to be less liable to get foul. (See Drawing, No. 444.)

281. Patent Gauge and Syphon Tap; James Boyd, Lewisham, S.E.

This tap has a tube extending nearly to the bottom of the cask, so as to avoid the necessity of tilting. A vertical glass tube on the upper part of the tap forms the gauge, indicating the contents of the barrel.

282. Patent Guard for Water Taps; Joseph West, 234, Shales Moor, Sheffield.

283. Rotary Sashes for preventing Accidents from outside Painting and Window cleaning; John Harrison, Page's Walk, Bermondsey, S.E.

The sash is held in its position by metallic or wooden tongues fitting into the grooves in the sash and runner in the frame, making it completely weather tight. When required for cleaning or otherwise, a key or turnbuckle, operating as a lever, forces the tongue out of the receiver, and the sash can then be used on its centres; and in shutting the sash the projecting bolts at top and the studs on the sill force the tongue into the groove in the runner, and the sash is fixed in its original position.

284. Patent Ventilator; John Wainright, Birkenhead.

The lower portion of this window sash is perforated with several holes, at an angle to admit fresh air into the room, with an inclined plate within the room to diffuse the draught. There is a corresponding arrangement at the top to allow the foul air to escape.

285. Patent Self-coiling Convoluted Shutters; Clark and Co., 15, Gate street, Lincolns'-inn-fields, W.C.

The shutter is composed of laths, in metal or wood, which are connected by strips of tempered steel, that form the connexion between the laths, and also cause them to coil or roll themselves up into a circular space above, below, or on either side of the window. Grooves are formed, in which the ends of the laths slide, and, when the shutters are closed, keep the springs straight; the springs also counterbalance the weight of the shutter, which is opened and closed with facility.—(See *Builder*, June 26th, 1858.)

286. Self-shadowed Glass for Windows; Rees and Co., Seckford Works, St. James'-walk, Clerkenwell, E.C.

The glass is formed by softening sheet-glass in a kiln, and pressing it between dies, so as to impress the required design. Flashed-glass is employed where colour is introduced, and if the pattern only is desired to be in coloured relief, the flat portion of the coloured face of the sheet is ground off after it has been annealed.

287. Patent Window Blind; W. Bailey.

The roller of this blind rests in two semi-circular bearings; one end of the roller is acted on by springs, and the other by a flat endless band.

288. Pemberton's Blind Mount; Gibbons and White, 345, Oxford-street, W.

This mount is made without a spring, can be raised or lowered by the side cord, and will stop at any position, immediately the cord is released, by the weight of the blind causing a small catch to fall upon a cog-wheel attached to the blind end.

289. Patent Lock; Hamilton and Nash, Isle of Dogs, E.

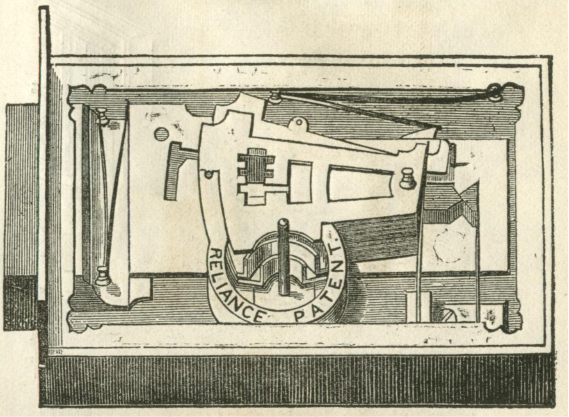
The bolt of this lock is not acted on by the key, but by a follower moved by a handle, so constructed that it disarranges the levers at the same time that it shoots the bolt, and thus the lock is locked without the use of the key. The bolt is so arranged that it shoots the width of the key farther than is necessary to clear the stump from the levers, and when fully shot, and only then, the key can be introduced into the lock, as it has to pass through a hole in the bolt which coincides with the key and the external key-hole. When the bolt is brought back, so that the stump is in contact with the levers, the key-hole is entirely closed, so that there is no means of getting any thing into the lock.

290. Open-Work Model of Patent Lock; Hamilton and Nash.

This lock resembles the former, excepting that here the bolt is moved by means of an escutcheon, and the levers are thrown by a triangular piece of metal, which is caused to rotate by two projections on the bolt striking it alternately when the bolt is shot forward and backward.

291. Patent Bank Lock; John Tann, 30, Walbrook, E.C.

In this lock the tail end of the bolt is formed of two plates, placed one over the other, the upper or rising plate forming the talon—these are hinged together at one end, with a slot at the other, so that if any force is applied to the talon plate before the tumblers are raised, the effect of such pressure causes the top plate to rise, immediately detecting the lock, and the slot catching against the back stump entirely takes off the pressure of the levers from the tumbler stump, so that the levers will not hang or indicate the height of the gating. The main stump is relieved from the pressure of the levers, so that if force is applied to the bolt, the levers will not hang or indicate the height of the gating through which the main stump passes; this is effected by a self-acting lever, working in the bolt and not operated on by the key. Supposing force was applied to the bolt for the purpose of picking it by any other instrument than the key, the effect of such force would be to cause the self-acting lever to hold in the bolt, and thus take the pressure of the stump from the levers, and it remains fixed until such force is removed, consequently, the very pressure, so fatal to other locks, in this affords additional security, and prevents the possibility of its being opened. The levers are protected by guards, which shut out the keys of all other patent locks. The guards are placed on several of the levers, either above or below them, so that even if a false key or pick succeeded in lifting the levers with unprotected fronts, it could not possibly raise those behind the guards, and the slightest extra lift at once fixes the detector, and then the proper key only can regulate it. A cylindrical nozzle is fixed to the outside of the face plate of the lock—in which is a circular piece of metal with a key-hole cut at right angles with the key-hole in the face plate of the lock, so that when the key is inserted, the key-hole in the nozzle is opposite to the one cut in the metal. The key-hole in the face plate being closed, the revolving metal in the nozzle is then turned by the action of the key, and brought opposite the key-hole in the face plate, closing up the aperture by which the key entered the nozzle, so as to always present a closed key-hole, whether the key is in or out of the lock. Thus it will be seen that the key-holes in the face plate of the lock and the nozzle not being opposite to each other, both can never be uncovered at the same time, and thus the introduction of any picking instrument is rendered impossible.



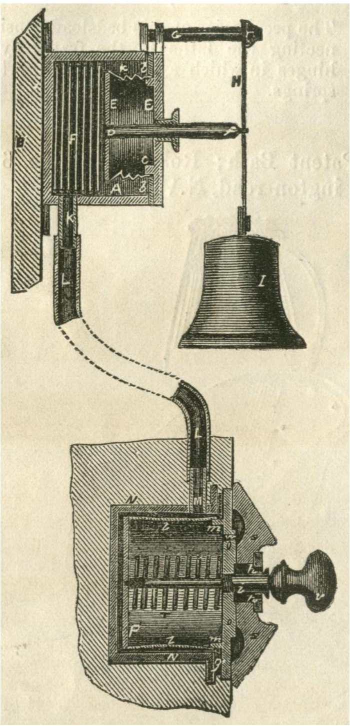
292. Model of Banker's Iron Safe, fitted with Blacket's Patent Inaccessible Lock; F. Blacket, 31, West Smithfield, E.C.

This invention proposes no alteration in the principles or construction of locks. It, however, success by placing the lock at the back of the safe, instead of on its doors, in obtaining the two conditions of security requisite; the lock picker can not get at the lock, and no amount of cutting or boring through the front of the safe by the burglar, can affect its security. A lock of any patent is so made and placed that it shoots its bolts upwards and downwards, which reach, and are hinged at their back ends to levers within the top and bottom casing of the safe; these levers have at their front ends teeth, which fit into corresponding recesses in the top and bottom of the doors for their whole width. When the bolts are shot out by locking, they press upon the back ends of these levers, and the front ends naturally rocking towards the door, the teeth enter these recesses, and the safe is locked. The lock is reached by a long handle into a slot in which is inserted, when needed, the true "key," which merely consists of the plate which rests upon the lock. This handle can be drawn out of the keyhole, just so far as to attach or allow of its removal, but cannot be entirely withdrawn. The inventor is thus enabled to make locks strong, with small and portable keys, while the lock picker is again baffled, for the key-hole itself is at all times partly occupied by the handle when the key is removed.

293. Rotating Disc Latch Bolt; R. Shaw, 15, King-street, Covent-garden, W.C.

This invention consists of a circular plate cut so as to admit of one of its portions being attached to a door, table, or window; upon the upper face of one portion of the plate a second disc is placed, carrying a spring bolt; this disc rotates on a centre, so as to allow it to be thrown across the door, table, or window, and to admit of the bolt being shot through a catch and socket, the asp and catch being attached to the second half of the first disc.

294. Patent Atmospheric Bell; John Willway, 29, St. Augustine's-parade, Bristol.



In this apparatus there is a length of ordinary gas pipe or other cheap tubing used as the medium of communication between a pair of strong and simple pneumatic valves or bellows, each enclosed in a small cast iron box. To one of these is attached the pull, and to the other the bell, and an impulse is instantaneously communicated from the one to the other. (See *Mechanics' Magazine*, November 13th, 1858.)

295. Patent Alarm and Detector; John Harper and Co., Albion Works, Willenhall.

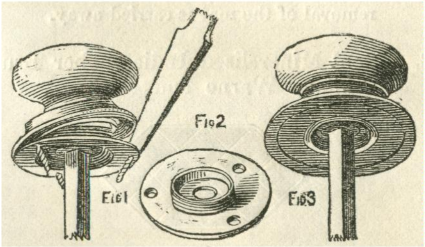
The object of this apparatus is to obtain, by means of a system of levers and connecting wires, acting upon the dial or index, an arrangement which shall possess the power of indicating, both by sight and sound, any burglarious attemps upon the doors or windows of a house, also indicating the part of the house upon which the attempt is being made.

296. Patent Lock Knob; Gibbons and White, 345, Oxford-street, W.

The rose plate is made with a mortised hob in that part of it which projects, so as to admit of a forked slide being dropped in—and the knob is made with a bush, which is grooved to receive the slide when the knob is applied to the rose plate in use. The rose plate is screwed to the door by a plain spindle passed through it and the follower of the lock. The knob is then applied, and the forked slide dropped in, effectually holding the knob, but allowing it to turn.

297 Patent Mount and Spindle for Lock Furniture; Pfeil and Stedall, Broad-street, Bloomsbury, W.C.

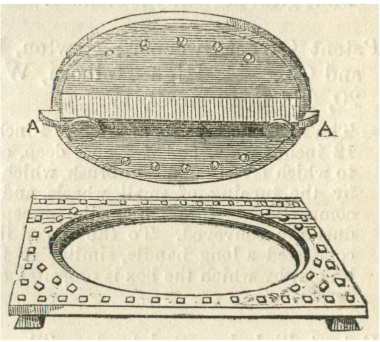
In this invention the under rose is so arranged that it can be detached.



298. Clark's Patent Door Knob; Hart and Son, Wych-street, Strand, W.C.

This knob has an adjustable spindle, one end having a nut screw, the other end being acted on by a spiral spring, so as retain it steadily in its position. The nuts and springs are within the knob.

299. Patent Coal Vault Plate; Pfeil and Stedall, Broad-street, Bloomsbury, W.C.

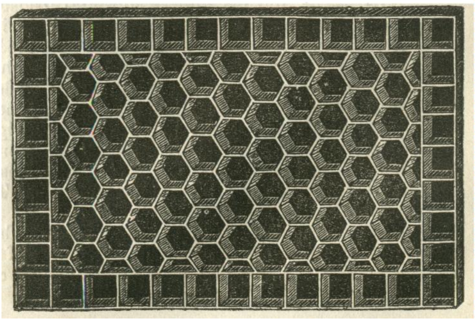


This invention has self-fastening bolts which cannot be unfastened from the outside.

300. Patent Adamas; S. Leoni, 34, St. Paul-street, New North-road, London, N.

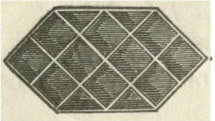
The specimens show the application of this material to door-handles, gas-burners, bearings, &c.

301. Patent Mineralised India-rubber Mats; William Warne and Co, 9, Gresham-street West, E.C., and Tottenham, N.



These mats consist of tubes of india-rubber, of various forms, placed vertically in contact with each other. No amount of wear can sensibly affect them; they thoroughly clean the feet like a brush, and the dirt removed falls through the cells formed by the tubes. They can be made with backs, by which means the dirt on removal of the mat is carried away.

302. Patent Mineralised India-rubber Brushes; William Warne and Co.



303. Patent Mineralised Kamptulicon; William Warne and Co.

This invention, applicable to the covering of floors and passages, consists in double proofing or coating strong canvass with a compound of india-rubber, ground cork, sulphur, and other materials, and then submitting the cloth to a vulcanising or curing heat, which prevents rigidity in winter and spreading in summer, makes the fabric extremely tough and durable, while great flexibility is attained.

304. Patent Carpet Sweeper; Newton, Wilson, and Co., 144, High Holborn, W.C. and 20, Old Bond-street, W.

The machine consists of a box, 14 inches long, 12 inches wide, and 4 inches deep, connected to which is a circular hair brush, which revolves by the turning of small wheels, and two tin compartments into which the sweepings and dust are conveyed. To the top of the box is connected a long handle, similar to that of a broom, by which the box is propelled along the carpet.

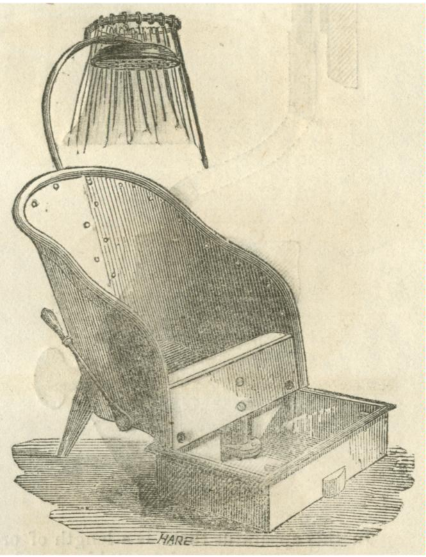
305. Patent Tubular Bedsteads; Thos. Allen, Hotwell-road Iron Works, Bristol.

The invention consists in forming castings or metal corner pieces, suitable for receiving tubular sides, foot and head rails, and also tubular uprights and posts. For these purposes, each of the corner pieces is formed in one piece, having two vertical projections and two horizontal projections at right angles to each other. The lower and upper vertical projections enter and fit the tubes which are to form the legs. The horizontal projections receive and fit into the tubes, which form sides, head, and foot rails. The models show a hospital bedstead with apparatus to assist the patient in rising, a reclining apparatus which can be adapted to any inclination, and a portable bedstead, which consists of two side rails of metal tubes made to fold by having a rule joint formed in them. The sacking or supporting fabric, at its edges, is sown over the side rails towards their ends, and on the undersides are fixed projections to enter the sockets of the legs or supports. The two pairs of legs used for each bedstead are crossed, and have sockets at their upper ends to receive the projections on the under side of the side rails. A full size bedstead packs in a case 8in.×5in. and 3 feet 2in. long.

306. Patent Hygienic Spring Lath Bedstead; Geo. R. Geyelin, 11, Heathcote-street, Gray's-inn-road, W.C.

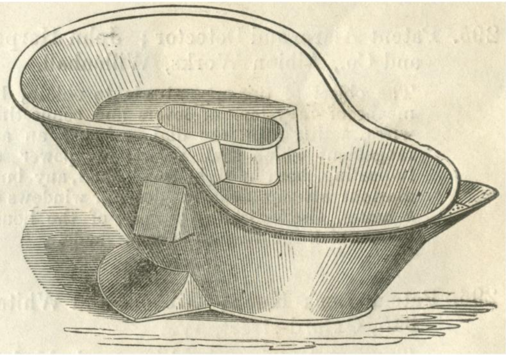
The peculiarity of this bedstead consists in connecting the laths to the frame by means of hinges in which are introduced vertical spiral springs.

307. Patent Bath; Robert Griffiths, 69, Mornington-road, N.W.



This bath is arranged so as to form an easy chair in a bed or dressing room. It can be used either as a foot, hip, sponging or shower bath.

308. Oxley's Patent Bath; Griffiths and Browett, 68, Bradford-street, Birmingham.



This bath combines a sponge bath, a hip bath, a foot bath, a bidet, and a nursery bath. The bather can have the feet immersed in hot water while sponging himself with cold.

309. Patent Mahogany Lavatory; George Jennings, 5, Holland-street, Blackfriar's-road, S.E.

310. Patent Mahogany Lavatory, with Enamelled Earthenware Splash Slabs; George Jennings.

311. Patent Mahogany Pedestal Water Closet for Dressing Rooms; George Jennings.

312. Patent Valve Closet and Trap, in one piece of Earthenware; George Jennings.

Fig. 1.

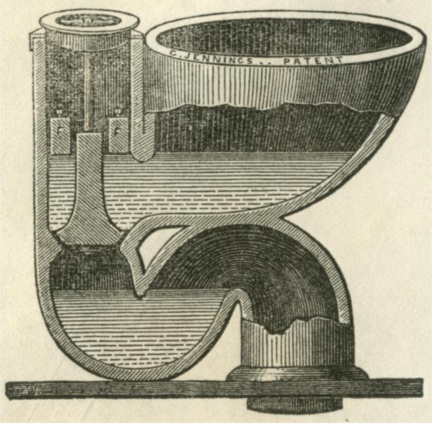
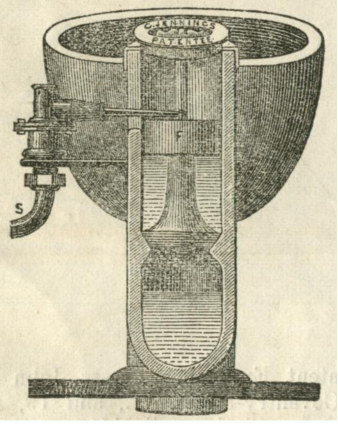


Fig. 2.



This closet is entirely free from machinery, the basin, the valve-seat, and the trap being complete, and are in one piece of earthenware. The D trap and fixing are dispensed with, and skilled labour is not absolutely necessary to the fixing of the closet. Fig. 1 is a view partly in section, the water being kept in the basin by the hollow plug or waste pipe, which at all times regulates the height of water. The lifting of the handle raises the hollow plug, and allows the contents of the basin to pass away; at the same time the float (EF), losing the water support, opens the valve, and insures an immediate wash, as also the required supply to the basin. Fig 2 is a view of the arrangement for supply, nothing more being needed than a common service pipe from the cistern or main to the union joint (S).

313. Patent Knuckle Washing Machine; T. Wheeler and Co., Albion Works, Oxford.

This machine has a revolving barrel inside and outside, on which clothes can be placed. This barrel works against compensating knuckle rubbers.

314. Patent Knuckle Washing Machine; T. Wheeler and Co.

This model shows an arrangement for placing the clothes between plates composed of knuckle rubbers.

315. Patent Washing Machine; T. Wheeler and Co.,

(See Drawings, Nos. 440 and 441.)

316. Patent Washing Machine; G. Weston and Co., 6, Pond-hill, Sheffield.

In this machine, when the handle is turned, a series of four frames, having two rollers in each, are caused to rise and fall alternately. The articles passing between these frames (an opening being provided for that purpose) are caused to be acted upon by these rollers, and thus a rolling, doubling, rubbing, and pressing operation is produced.

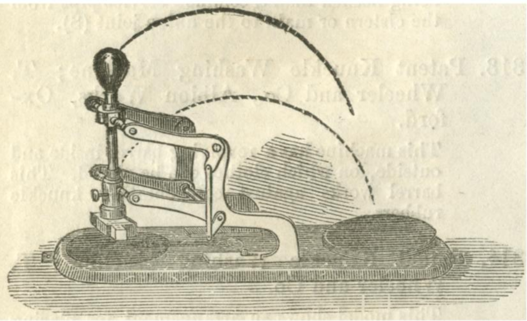
317. Juckes's Patent Washing Machine; W. Young, 33 and 34, Queen-street, Cheapside, E.C.

This machine consists of a pair of conical rollers, placed at right angles to a vertical axis in the centre of a tub, which axis is turned by levers extending over the sides of the tub. The linen to be washed is placed at the bottom.

MISCELLANEA.

(*For remainder of the articles in this Section see the Drawings.*)

327. Patent Parallel-Motion Endorsing Machine; H. R. Palmer, 181, Waterloc Bridge-road, S.



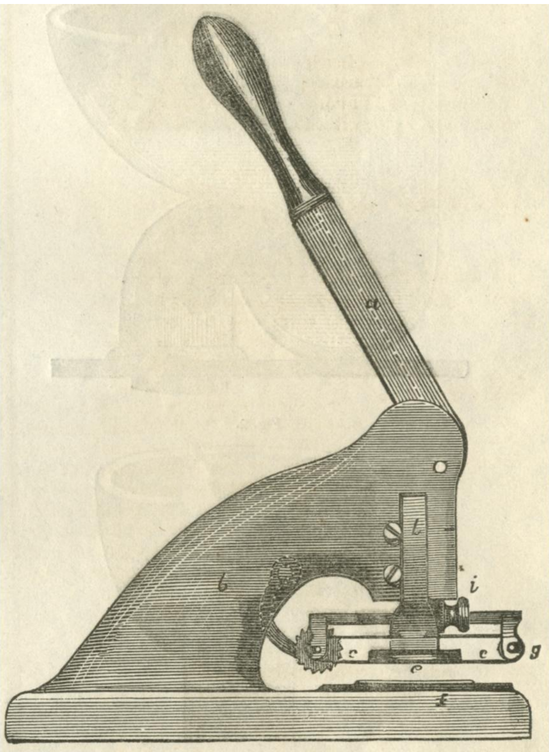
A stem or handle is made use of, to which are joined radius links or bars moving on fixed centres attached to the framing of the machine, and forming a parallel motion, whereby the movement of the stem or handle is guided in such a manner as to cause the surface of the stamp or die affixed thereto to meet the surfaces of the inking and stamping pads in a perfectly parallel manner, thereby ensuring its whole surface receiving a due amount of ink. The inking pads are made circular, having a tray for containing the ink, and covered with an absorbent material. The advantage this machine has is that the blow can be repeated as often as required in the same place, so that in marking linen or other fabrics it will be perfectly saturated.

328. Patent Endorsing Press; T. Gehrling, 15, William-street North, Caledonian-road, N.

In this press there is a double action. The die when depressed is brought on to the inking cushion, which is drawn from under it before it reaches the bed on which the impression is made.

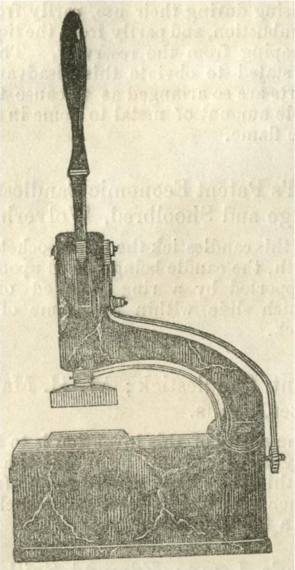
329. Patent Endorsing Press; Griffith Jarrett, 37, Poultry, E.C.

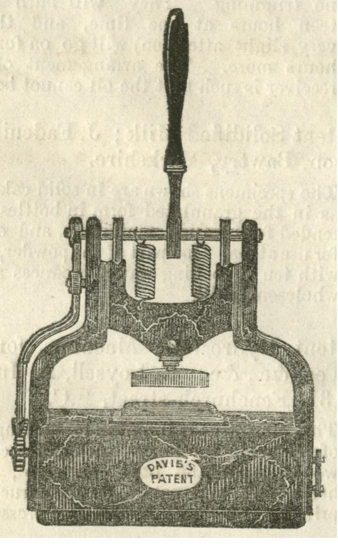
This press is intended for printing in colours without the use of fluid inks, carbonic or other chemically prepared paper, silk, or other suitable material being substituted. This chemically prepared material is formed into endless bands, which are stated to be capable of giving more than a thousand impressions before requiring to be changed. The stamping action of the machine brings continually a fresh supply of colouring matter to the die or type, so that there is no interval of time wasted between the successive impressions, and the press is always ready for use. The die or type-holder is attached to the slide of the press by means of a taper-dovetailed key, so that it can be instantly removed for changing the dates, or for being replaced by another die. Embossing dies with copper counterparts may also be used in this press.



330. Patent Endorsing Press; John Davis, 7, Coventry-street, W., and 19, Percival-street, Clerkenwell, E.C.

The improvement in this press consists in so arranging parts that one movement of the lever will cause the descent or motion of the printing surface, by which that surface will be inked; while another movement of the lever (in a contrary direction) causes the descent of the stamp or printing surface by which the printing or embossing, &c., is effected. The ink is enclosed in an air tight metal box. The lever of the press has an arbor or axis carrying a double cam, so that when the hand lever is moved from its position of rest in one direction, the one cam acts on the slide-carrying die or printing surface, causing it to descend; also, when such lever is moved in the opposite direction, it causes a like motion of die or printing surface by the other cam. With this other motion, however, a change takes place in the pad surface receiving the pressure of the die, or printing surface. This recipient of the pressure is mounted on a shaft, which, by the latter motion, is caused to make half a revolution, and so turns it upside down, by which means an inking or colouring pad is presented to receive the pressure of the die or printing surface when it descends, which thus becomes inked or coloured. In order to cause the motion of the ink pad, another cam, placed on the lever shaft or arbor, comes into action. In this direction of its motion, when the lever is released, the die or printing surface rises by the tension of its springs in the ordinary manner, when the cam moving the pad retires, a spring causes the return motion of the shaft carrying the pad, which is immediately reinverted, so as to present a pad to receive the pressure of the printing surface or counterpart of the die. If for embossing, the embossing or printing is then effected by the opposite motion of the hand lever. The cam moving the pad acts on the short end of a lever, the opposite end of which carries teeth gearing into a pinion on the pad shaft.





331. Secure Letter Box; F. J. Candy, M.A., Cambridge.

This letter-box consists of two chambers, an upper and lower one; the upper chamber contains a shoot, turning on a horizontal axis, the upper end or mouth of which can be drawn or pushed forward to receive the letters. When let go, the shoot falls back, by the weight of the lower end, to the vertical position, and the letters fall straight down into the lower chamber. A block between the two chambers prevents the introduction of any wire or pincers to draw out the letters, by completely stopping the lower end, or throat, of the shoot so long as the upper end or mouth is in the least degree open. This letter-box may be opened either by pulling out the upper end of the shoot with one hand, while the letters are dropt in with the other, or by pushing in a plate, which stands out in front above the top of the shoot, with the back of the hand which holds the letters, when the mouth of the shoot is pushed out, and the letters are dropt into it. The box may be made of different sizes, suitable for pillar-boxes, post-offices, and private doors.

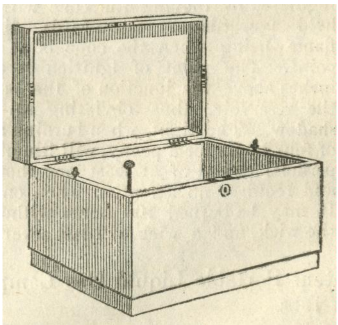
332. Improved Dabber for Engravers; Thomas Dixon, 4, St. James's-place, Hampstead-road, N.W.

This dabber is intended for laying etching and re-biting grounds. Its advantage consists in the ease with which the face can be changed for silk, leather, or other material, without disturbing the stuffing of the dabber, which retains its perfect regularity of form.

333. Dabber for Steel and Copper-plate Printers; Thomas Dixon.

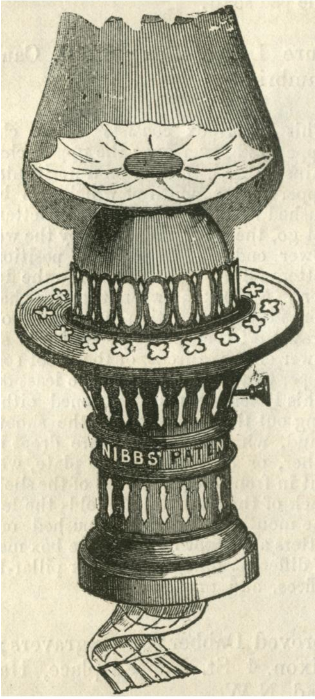
The dabber is filled with horsehair, to give lasting elasticity, and is so arranged that the cap or surface can be easily renewed as often as may be required.

334. Patent Telescopic Despatch Box; W. Child and Son, 51 and 51A, King's-road, Brighton.



335. Josee Johnson's Index or Book Mark; Thos. S. Woodcock, Manchester.

336. Patent Portable "Bude" Light; Syson Nibbs, Birmingham.



The accompanying woodcut shows this burner in use, (the oil vessel and part of the china being removed). The novelty of this invention consists partly in the peculiar arrangement of the parts, whereby no heat whatever is communicated to the oil vessel, and partly in the arrangements for admitting orygen to the interior and exterior of the flame. The cost is about a farthing per hour. The air to feed the interior of the flame is admitted through the lower portion of the wind-guard, and its connexion with that admitted to the exterior of the flame entirely cut off, the latter passing through the upper portion of the windguard, and through a perforated plate. The flame is then deflected horizontally by a button at the top. The oxygen, after leaving the perforated plate, issues through a cone, the top of which is considerably below the point of ignition, and the intensity and magnitude of the flame is regulated by moving the cone with the globe held upwards or downwards, the largest flame being when the cone is at its lowest point. The point of ignition is at least 3 inches above the junction of the burner with the reservoir, thus obviating all heat and shadow. The light, when burning at the rate of four hours for a penny, will illuminate a superficial extent of at least one thousand feet, and requires no attention when once lighted. It may be burned 100 hours without cutting the wick, and a wick will last several months.

337. Patent Portable Liquid Gas Lamps; Syson Nibbs.

This lamp is adapted for burning hydro-carbons such as petroleum, belmontine, &c. A wick, one inch wide, produces a brilliant flame an inch and a half wide by an inch and a half high, and the cost, at the present price of the oils, is at about the rate of eight hours for a penny. The great objection to burning these light oils in closed rooms has hitherto been the smell arising during their use, partly from imperfect combustion, and partly from the liquid partially escaping from the reservoir. This invention is stated to obviate this disadvantage. The parts are so arranged as to cause the least possible amount of metal to come in contact with the flame.

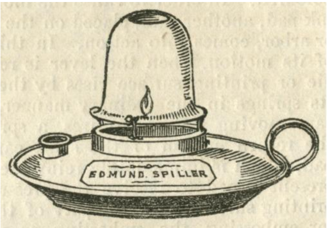
338. Boyd's Patent Economic Candlestick; Loveridge and Shoolbred, Wolverhampton.

In this candlestick the usual socket is dispensed with, the candle being placed upon a pin, and supported by a ring mounted on standards, which slide within the frame of the candlestick.

339. Patent Candlestick; W. H. Manning, Devizes, Wilts.

The object of this invention is to hold securely any sized candle, by means of a curved plate within the socket, moved to and fro by a screw when applied to a brass candlestick, or a spring in a tin candlestick.

340. Lover's Lamp; Edmund Spiller, 98, Holborn-hill, E.C.



The inventor states that these lamps requrie feeding only once a week, and require no trimming. They will burn for eighteen hours at one time, and then (with very slight attention) will go on for eighteen hours more. The arrangement of the oil-receiver is such that the oil cannot be spilt.

341. Patent Solidified Milk; J. Fadeuilhe, Misson, Bawtry, Yorkshire.

The specimens shown are in solid cakes, as well as in the granulated form in bottles. It is intended for invalids, emigrants, and others, and for use at sea. One part of the powder, rubbed up with ten of boiling water, produces a pure and wholesome milk.

342. Patent Hydrostatic Machine, for Coffee, Tea, &c., &c; E. Loysell, A. Inst. C.E., 131, Fenchurch-street, E.C.

This apparatus is intended for making infusions of vegetable substances, such as tea, coffee, dye-woods, malt and hops, beet-root, medicinal herbs, bark, and roots, and is constructed on the principle of direct hydrostatic pressure. The substance to be operated upon is placed between two perforated diaphragms, as shown in Fig. 1, and the liquid being poured into an upper reservoir descends through the substance, expelling the air from between the particles, and extracting all the useful parts, either aromatic, colouring, nutritious, or otherwise; afterwards, by opening the tops of the apparatus, the infusion percolates downwards through the substance a second time, thereby filtering itself, and is drawn off perfectly bright. When it is desired to operate on large quantities of vegetable substances, the substance is divided equally in several chambers, formed by the superposition of perforated diaphragms. The operation is the same as heretofore described. Fig. 1 shows a section of the apparatus adapted for domestic use, for preparing tea and coffee on the table. Fig. 2 shows the same apparatus, provided with a second vessel underneath, in which the infusion may be kept hot and good any time, being surrounded by a "Bain-Marie," and having heat underneath, this model being adapted for the use of large establishments. For manufacturing purposes the apparatus is constructed to act by steam power. (See Drawing No. 448.)

Fig. 1.

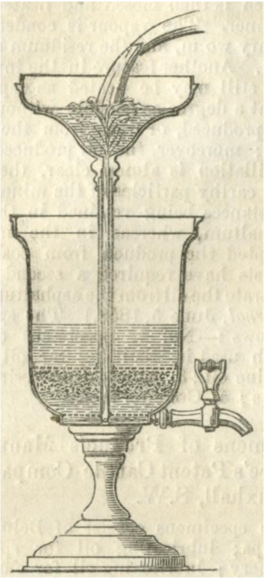
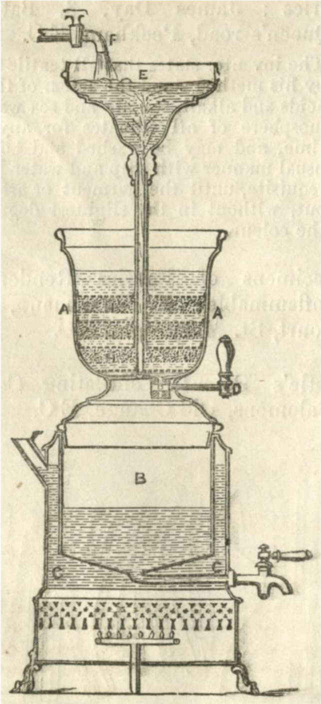


Fig 2.



343. Patent Self-Supplying Fountain; A. E. Galliard, 2, Seymour-place, Clerkenwell-green, E.C.

In the body of this fountain there is a piston, to which india-rubber bands are connected. There is an arrangement by which the piston can be wound up, and the elasticity of the india-rubber is made to act upon it so as to force up the water through the nozzle.
(See Drawing, No. 447.)

344. Patent Transforming Baking Dish; E. Stevens, 5, 6, and 7, Cambridge-road, N.E.

This apparatus combines a stew-pan, hash-dish, potatoe, and meat baking dish.

345. Patent Reticule Muff; George Ellis, 4, Collier-street, Pentonville, N.

In this muff the space between the fur and the lining is formed into a bag, with a purse fixed within it.

346. Patent Elastic Hats; J. and F. Gillham, Oldham.

These hats have an opening in which is inserted a piece of elastic material, so as to allow them to expand, and prevent undue pressure on the head.

347. Patent Hat Ventilator and Railway Ticket Clip; E. T. Archer, Bridgefield House, Wandsworth, S.W.

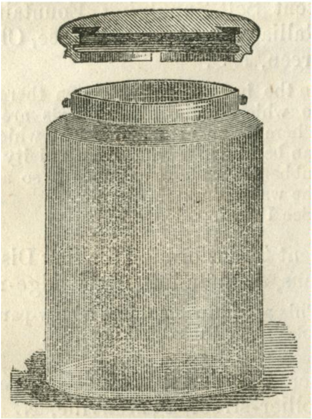
348. Elliptic Metron, for Hat Manufacturers; O. H. Hodges, 5, Crown-street, Finsbury-square, E.C.

This instrument is designed to remove the difficulty of measuring hats of eccentric form. A slide rule takes the length of the hat, and a travelling slide indicates the exact cross measurement at any distance from the back or front.

349. Patent Bottles for the Prevention of Accidental Poisoning; Savory and Moore, 143, New Bond-street, W.

These bottles are hexagonal in shape, with deep fluting or grooves running lengthways along the bottle. To the sight and touch they instaneously present most striking points of difference from any other kind of bottle. Vessels of this description, made in blue glass, are intended to be used for external applications only. For poisonous and powerful medicines, the dose of which is a tea-spoonful and under, bottles similarly shaped and fluted in white glass are proposed to be employed. The bottles are provided with a new contrivance, the effect of which is to make it impossible to pour out the contents otherwise than very slowly and gradually, almost drop by drop. This is accomplished by contracting the neck of the bottle at the lower part by the shoulder, and the mouth being of the usual size, the process of filling is but slightly affected by the contraction.

350. Patent Improved Air-Tight Jars; W. Pearce, 7 and 8, Bridge-street, Bristol.



The covers are lined with cork or other elastic material, and are fastened by a modification of the bayonet fastening. (See Drawing, No. 446.)

351. Fellows' Patent Brass Vent-Peg; Agents R. and J. Slack, 336, Strand, W.C.

This vent-peg is a conical screw, with a flat handle, which enables the vent to be opened or closed with facility.

352. Patent Imitation of Human Hair; E. Speight, 19, Woodbridge-street, Clerkenwell, E.C.

The materials used in this manufacture are the fibres of the Abaca Manilla, or other foreign hemps, which are dyed of the required colour, dressed and worked up into various ornamental patterns or designs, so as to form effective substitutes for head ornaments in natural hair. Head dresses and other ornamental articles manufactured according to this patent, are not only cheaper than those of human hair, but are stated to be lighter, cleaner, and less liable to becoming disturbed when in use.

353. Specimens of Products obtained by Lee's Patented Process for Manufacturing Mineral Oil; S. Lee, East Philip-street, Salford, Manchester.

This invention consists in distilling the oil contained in coal, cannel, schist, or other mineral bituminous substances, by combining them with asphaltum or pitch and by the application of heat, which dissolves the asphaltum, and causes the mineral bituminous substances to give off their oil in the form of vapour. The bituminous substances and the asphaltum are broken into pieces of any convenient size, and the whole is put into a common still, which is then closed and heated in the usual manner. The vapour is condensed in an ordinary worm, and the residuum may be used as fuel. Another feature in the invention is that the still may be heated as rapidly and to as great a degree as possible without injury to the oil produced, or waste from the production of gas; moreover, the oil produced by the single distillation is almost clear, the carboniferous and earthy particles of the mineral bituminous substances being retained in the still by the asphaltum, whereas in the modes hitherto adopted the products from coal, cannel, and schists have required a second distillation to separate the oil from the asphaltum. (See *Mining Journal*, June 5, 1858.) The specimens are as follows :—No. 1. Specimens of cannel and pitch used in distilling tar oil; 2. Burning leesine oil; 3. Lubricating leesine oil; 4. Parraffin; 5. Coke for fuel.

354. Specimens of Products Manufactured by Price's Patent Candle Company, Belmont, Vauxhall, S.W.

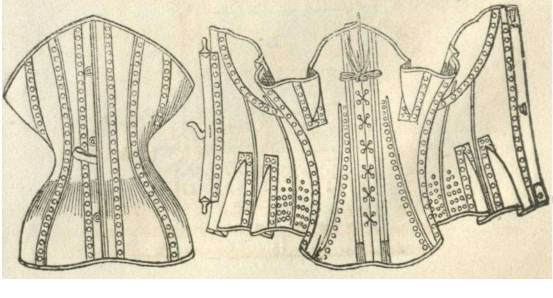
The specimens consist of Belmontine oil for lamps; lubricating oil for spindles of machinery; lubricating oil for shaftings and the bearings of heavy machinery; Sherwoodole for removing stains of grease on silks, satins, &c., Belmontine candles; Glycerine soap; Gishurst compound, for preventing and destroying the red spider, scaly mealy bug, thrip, and the green and brown fly.

355. Permanent Black Dye on all Textile Fabrics; James Day, 3, Bath-terrace, Queen's-road, Peckham, E.C.

The inventor states that all textile fabrics dyed by his method stand the action of the strongest acids and alkali, sea air and sea water, the atmosphere of all climates for any length of time, and may be washed and boiled in the usual manner with soap and water as often as requisite, until the garment or article is worn out, without in the slightest degree injuring the colour.

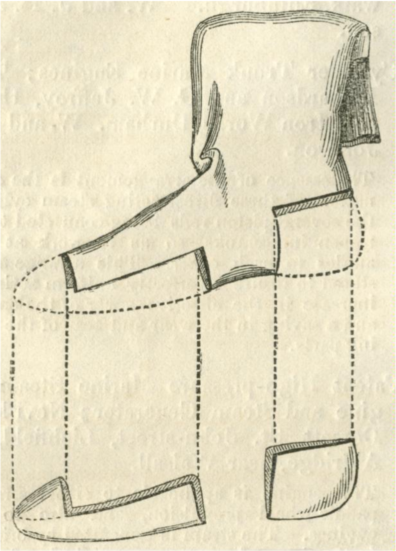
356. Specimens of Fabrics Rendered Non-inflammable; F. Versemann, 7, Bury-court, St. Mary Axe, E.C.

357. Castle's Patent Ventilating Corset; A. Salomons, Old Change, E.C.



This invention consists in a considerable number of perforations being made in the corsets by which they are rendered ventilating.

358. Patent Renewable Stocking; H. Owen, Swiss Cottage, Portswood, Southampton.



This stocking is so manufactured as to admit of the removal of the worn parts, and the supply of new, with no risk of disturbing the fabric, and without the necessity of darning or overlapping. By removing the worn parts, and supplying, at a trifling cost, a new sole or heel, the stocking will be made equal to new, and this operation can be performed in a few minutes. The woodcut shows the arrangement of the seams.

359. Patent Ladies' Shoes; Louis Leprince, 261, Regent-street, W.

360. Foot Warmers; J. H. Hume, Broughton Ferry, Dundee.

361. Prepared Vegetable Fibres for Paper making; W. Humber, Pancras Chambers, Pancras-lane, Bucklersbury, E.C.

362. Patent Apparatus for destroying Vermin; P. Dumont, Southwark-square, Borough, S.E.

This apparatus consists of an india-rubber ball with a nozzle, filled with powder, which, by pressure, may be forced out as required.

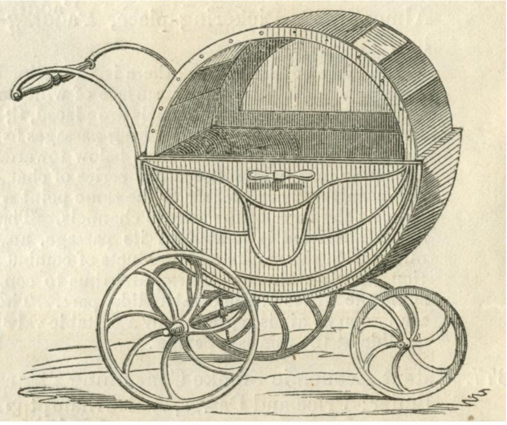
363. Patent Knife and Fork Cleaning Machine; Weedon and Rice, 41, Poland-street, Oxford-street, W.

This invention consists in keeping the knives to be cleaned flat upon the rubbing-board, by means of moving wedge-shaped pieces fastened to a T-shaped lever, which moves horizontally, placed beneath the board; the wedges or tongues working in eyes passing through the board, and being made to rise by spiral springs. The knives are cleaned by a hand-brush. After being released from the tongues, the knives are then simultaneously turned by a small handle above the knife receivers, to be operated on on their reverse side.

364. Patent Vegetable Leather; George Spill and Co., Old Farm House, Stepney-green, E.

This material is composed of a textile fabric coated on one side with caoutchouc and other matters. The grain, in imitation of the surface of leather, is given by engraved rollers. It is stated to be much cheaper than leather, and can be ornamented in the usual way by book-binders.

365. Patent Perambulator; J. B. Thomber, Great Russell-street, Bloomsbury, W.C.



This perambulator is so constructed that it can be made a double or a single, and a closed or an open carriage, with windows, or a bed. The body of the carriage forms a little more than a half circle, with slots or grooves inside, in which a semicircular hood or cover, made of light material, slides. The sides contain glass windows, moving on an axle, and capable of being turned up or down, so as to be a partial or an entire cover from both rain and sun. One seat folds so as to form a bed. There is a screw in the axle and spring, whereby to raise or lower the back of the carriage.

366. Model of Proposed Balloting Booth; Robt. Essery, 36, Berners-street, W.

The model represents an ordinary apartment, —with the front wall down—divided across by a screen; a space in front of this screen is railed off for desks for the persons appointed to verify the voters, and for seats for the returning-officer and candidates. Behind the screen are two divisions, each containing the requisite number of tell-tale gates or doors, which register the votes; the voter having had his right to vote verified, passes behind the screen, and through whichever of the tell-tale doors he pleases, and returning by the opposite side of the screen, passes out.

DRAWINGS.

375. Houston's Patent Smoke Consuming Furnace for Engine Boilers; F. W. Campin, 156, Strand, W.C.

This invention proposes to get rid of the smoke by destroying it in its nascent state, by means of gas flame applied at or near the back of the furnace, so that the smoke shall be consumed ere it reaches the chimney. In the drawing this is shown as effected by means of a hollow bridge, into which inflammable gas is introduced by one pipe and atmospheric air (to prevent the formation of a vacuum in the bridge) by another, the gas being lighted at a slit or perforations in the top of the hollow bridge, and the nascent smoke having to pass this gas flame is thus consumed.

376. Patent Improvements in Furnaces for the Better Combustion of Smoke; Thomas Almond, 22, Pickering-place, Paddington, W.

In the body of this furnace there is an inclined water space, on the upper surface of which a double series of fire-clay channels are placed, the series next the water-space forming passages for the products of combustion from below towards the upper part, while the other series of channels admit and conduct air to the same point of issue as the issue of the smoke channels. The air so admitted is heated in its passage, and mixes with the smoke and products of combustion, causing them to ignite, and thus to consume the whole of the combustible part. The admission of air is regulated by a suitable valve or slide at the ingress opening.

377. Patent Economic Smoke Consuming Steam Boiler; Price and Dawes, Wolverhampton.

(See Model, No. 8.)

378. Annular Cylinder Engines, for Screw Propellers; Joseph Maudslay, Lambeth, S.W., and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

In this arrangement the annular cylinder is placed above the crank-shaft, instead of below it, whilst the piston-rod cross-head is connected with the main-crank, on the propelling-shaft, by a connecting-rod passing from the piston-rod cross-head downwards, through the central or inner cylinder, to reach the shaft beneath.

379. Patent Rotatory Steam Engine; J. and E. Harthan, Congleton, Cheshire. W. and J. H. Johnson.

This engine is actuated by a jet of steam or air, which impinges on the curved bottoms of the chambers, and imparts a rotatory motion to the wheel.

380. Patent Marine Engine; J. A. Limbert.

(See Model, No. 7.)

381. Horizontal Engines of the Screw Steamer Metropolis; T. Meacham, Victoria Foundry Company, Greenwich, S.E. W. and J. H. Johnson.

382. Inverted Double Cylindered Expansive Marine Engines. W. Marshall, Leith-walk, Edinburgh. W. and J. H. Johnson.

383. Cylinder Trunk Marine Engines; Thos Richardson and G. W. Jaffrey, Hartlepool Iron Works, Durham. W. and J. H. Johnson.

The essence of the arrangement is the combination of three direct-acting steam cylinders, the several piston rods being connected to corresponding cranks, so as to work at equal angles to each other. This arrangement is stated to insure a perfectly uniform action, an increase in the effective power of the engines, and a saving in the wear and tear of the working parts.

384. Patent High-pressure Marine Steam Engine and Steam Generator; Neville and Dorsett, St. John-street, Lichfield, and Aldridge, near Walsall.

This engine is applicable to either screw or paddle-wheel propulsion, and also to land engines. The steam is generated by bringing, in the shape of spray, a small body of water, already heated to near boiling point, in contact with high pressure steam and a large heating surface of metal; the steam thus generated being superheated before entering the working cylinder, consequently the boiler and large body of water is dispensed with, and hence there is great saving of fuel.

385. Patent Universal Engine Governor. Price and Dawes.

(See Model, No. 10.)

386. Patent Adjustable Expansive Gear. Price and Dawes.

(See Model, No. 10.)

387. Marine Engine Spring Governor; Peter Jensen, 7, Mount-garden, Westminster-road. S.

This apparatus has for its object to prevent the great inequality in the speed of marine engines, which arises from the immersion and emersion of the propeller in a heavy sea. It consists of a cylinder placed inside the ship, under the water level, either on one or on both sides of it, and near to the propeller. This cylinder is fitted with a piston, on one side acted upon by the water, whilst the other side is counter-balanced by a spring; the piston is connected with the throttle valve of the engine. The more deeply the propeller of the vessel becomes immersed, the more the pressure on the piston increases. The connection with the throttle valve is so arranged that as the pressure on the piston increases, this latter is thrust against the spring opening the throttle valve, and *vice versa*. The drawing shows one arrangement of the apparatus in a screw steamer.

388. Patent Miner's Safety Cage; R. Aytoun, Edinburgh. W. and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

In these cages the actual winding rope or chain is connected at its lower end by a ring or hook, to which again is attached a double chain, connected diagonally to the cage, through the intervention of certain spring clipping levers. On each opposite side of the cage there is centred a duplex jamming or clipping lever, set upon a fixed stud centre, and disposed in opposite or reversed directions as regards each other. It is to the shorter arm of each of these levers that the double chain already referred to is attached, the two ends of the chain being attached respectively to a lever. This end of each lever has also a spring attached to it, the other end of these springs being connected to fixed studs upon the cage. The opposite longer arms of the jamming levers are formed with lateral projections, embracing the main vertical guides of the mine-shaft, the relations of the parts being such that, so long as the jamming levers are kept in a horizontal position, the cage can work freely up and down the guides; but when they are thrown out of the horizontal line, the lateral projections upon the levers jam firmly upon the guides on each face, and this occurs when the winding rope fails.

389. Patent Draw and Buffing Springs; Wright and Co.

(See Model, No. 47.)

390. Patent Continuous Railway Break; Meakin and Burrell, 3, Bucklersbury, E.C.

This invention consists in applying ropes or chains passing under and over levers attached to the blocks; these are wound up by means of a screw-wheel and drum, with a strong spring attached, so as instantly to take up all slack. There is also an apparatus for compensating for any slack caused by the carriages coming closer together when the breaks are applied, or for any variation in the distance between the carriages; also for holding fast the rope or chain in the event of breakage or disconnection.

391. Patent Improved Railway Turntable; B. Martin and C. J. Light, 26, Great George-street, Westminster, S.W.

This turntable, when not in use, has dead or solid bearings at points under the ends of the rails. In this position the rollers upon which it is to turn do not touch the roller path, and are thus preserved from injury during the passage of trains, while all that is necessary to prepare it for use is to raise these rollers by a simple arrangement of levers, so that the table is lifted off its dead bearings, and rests upon the rollers, in the same way as an ordinary roller turntable.

392. Patent Cup-trough Sleepers; J. Samuel, C.E.

(See Model, No. 57.)

393. Designs for Permanent Way. Christopher Hill, Chippenham.

(See Models, Nos. 51 and 52.)

394. Patent Plate and Channel Iron Permanent Way. J. W. Cruickshank.

(See Model, No. 56.)

395. Railway Chairs and Fastenings; R. N. Bow, 7, South Gray-street, Edinburgh.

In the annexed woodcut Figs. 1 and 2 show a method of fixing the rail in the chair by means of screws. In Fig. 3 a cylindrical wooden key is employed.

396. Patent Improved Carriages; C. Hadley, 37, Lower Hurst-street, Birmingham.

These improvements apply to every description of public and private carriage. They consist principally in altering or reversing the position of the present body (2 A, coloured yellow) enlarging it, and dividing or recessing the inside—in removing or simplifying the forecarriage—in forming the crosstree so as to be a substitute for springs and dumbsprings—in curving the axle so as to lower the centre of gravity to within a foot of the ground, and form the draw bar by having the pole or shafts attached direct to it—in constructing a second or third body on the roof, or under the present body, so as to double or treble the present number of sheltered seats or cubical space without much increase of height or weight, and admit of a division of classes, whilst it separates the heavy or wet from light or dry goods. In the drawings the second or additional body is coloured lake, and marked B; and the third coloured green and marked C. In railway carriages the sides and divisions are made substitutes for the present underframing; and in "lorries," the distance between the wheels is reduced, or the width of the body increased by making the springs, &c., to work within the thickness of the sides, and employing peculiar metallic naves, as seen in 8, A, B, C, D and E.

397. Velocipede; T. E. Merritt, Rochester.

In this machine, the weight of the traveller, re-acting from an elastic seat, is the propelling power. A is the framing, to which is bolted the spring seat B. H is the guiding handle, turning in an iron arch, the axis being fixed to the middle of the fore-axle. CC are two mechanical legs, working on the centre D; EE are the forked iron toes. FF are two of Hodges' Accumulators, serving as springs to pull up the legs after each stroke. G is a stop, to prevent the legs being raised too high by the springs. The impulse is given by the foot pressing on the mechanical leg; as each leg straightens, the whole weight of the traveller rests on it and the seat B, thereby causing a powerful impulse forward. In this machine the wheels run on the axles, which are similar to those of a coach.

398. Pillar or Wharf Crane; Dunn and Co., Manchester.

This crane is constructed to lift 2½ tons. The pillar and foot plate are cast together, and the frame which carries the gearing is fitted with anti-friction rollers, and also carries the foot of the jib, which is made of wrought iron bars, with a pulley at the top for the chain.

399. Pillar or Wharf Crane; Dunn and Co.

In this crane the cast-iron jacket or case, which carries the gearing and brake, revolves upon a wrought-iron pin on the top of the pillar; the jib is made of cast-iron, with head pulley and chain, and is supported by strong wrought-iron tension rods from the top of the jacket.

400. Portable Crane; Dunn and Co.

This crane is constructed similarly to No. wharf crane, with balance box at the back, and mounted upon an oak carriage with wheels to move it along.

401. Portable Crane; Dunn and Co.

This crane is constructed similarly to No. wharf crane, with balance box, oak carriage on wheels and axles.

402. Pillar or Wharf Crane; Dunn and Co.

This crane is constructed with cast iron pillar, base plate, and jib made of two wrought iron bars fixed to a box or frame.

403. Steam Excavating Machine; Dunn and Co., Manchester.

This machine was designed for excavating the canal through the Isthmus of Suez. It is worked with engines of 12-horse power, and is calculated to excavate 45 cubic yards of sand, clay, gravel, or common earth per hour. In appearance it is similar to a swing pillar crane, with engine and boiler, mounted on a carriage with four wheels geared from the engine. The excavating bucket or scoop is attached to the blocks at the fore part, and is thrust forward into the earth by a double lever, at the same time it is being elevated by the blocks and gearing worked from the engine until filled, when it is swung round and emptied into the ballast waggons by drawing out the back part of the scoop with a lever.

404. Anti-Friction Press; T. A. Weston, Birmingham.

This press consists of four solid equal cylinders with a reciprocating plate interposed, which traverse on a plane surface as foundation, and under two equal inclined planes, formed in a part which rises and falls the height of the said planes as the plate moves to and fro, and which is in contact with the frame enclosing the whole, only with the intervention of loose rollers at its edges. The reciprocating rectilinear motion of the plate through a given space is converted into rectilinear motion at right angles through a space a 100th or 150th of the first, according as the height of the inclined planes may be made. The plate moves through twice the distance traversed by the cylinders. This answers to the long end of the lever—the short one being represented by the part having the inclined planes, and moving a distance equal to their height.

405. N. Harvey's Patent Steam Hammer; D. Cook and Co., Glasgow.

In this steam hammer, all the moving parts are malleable iron. The hammer ram is lifted by the cross-head through which the ram passes, and is fixed by a cotter bearing on the top side of the cross-head. From this cross-head descend two piston-rods, and pistons are on each side of the ram, working into two cylinders which, at the same time, form the hammer-guides and frame. One balance valve actuates both pistons at the same instant of time. The motion of the handle working the valve being the same in direction as that of the hammer, renders it convenient to give the strokes of the required weight and at the proper time. The cushion of compressed air which is formed during the descent of the piston, gives increased effect to the fall of the hammer, when steam is not used for that purpose; or, when steam of a less pressure than 30 lbs. is used, the air is allowed to escape into the exhaust pipe, and the hammer does its work by gravity alone. (See *The Engineer*, 3rd September, 1858.)

406. Patent Moving Cylinder Steam Hammer; John Condie, Glasgow; W. and J. H. Johnson, 47, Lincoln's Inn-fields, and Glasgow.

407. Mechanical Railway Chair Moulder; W. White, South Shields; W. and J. H. Johnson.

This railway chair moulder is stated to be capable of moulding 300 chairs per hour, when worked by two boys.

408. Patent Steam Riveting, Punching, and Shearing Machine; D. Cook and Co., Glasgow.

409. Schmidt's Patent Core Bar; D. C. Phillipson and Co., Manchester.

This bar is intended to be used without hay or straw bands. The several sections into which the core bar is divided longitudinally are hinged each at one extremity to an end plate, so that each section can fall inwards on its hinge, towards the central line or axis of the bar, after the other end plate supporting the free ends has been moved. When thus free from the article cast upon it, the removal of the core bar is easy.

410. Schmidt's Patent Ladles for Casting Metals; D. C. Phillipson and Co.

The metal, when poured from this ladle into the mould, is drawn from the lower part of the ladle, and the scum or slag floating on the surface is kept back.

411. Patent Brick Machine; Joseph P. Oates, Erdington, near Birmingham.

In this machine the moulds are filled by the operation of a compound Archimedean screw, having a less area of pressure than the area of the moulds, whilst all risk of damage to the machinery by undue strain, as well as wasteful consumption of motive power, are prevented by the escape of a column of clay, equal in sectional area to that of the screw; so soon as the brick has received its proper amount of pressure, which is regulated by the length of the tube or passage through which it escapes.

412. Patent Improvements in Kilns, Furnaces, Flues, and Drying-rooms; Johnson Hands, Epsom.

In kilns of this construction, instead of the heat being allowed to pass away at the top of the kiln into the atmosphere, the kiln is closed in at top in such manner that the products of combustion enter a flue which descends from the top of the kiln to a horizontal flue or flues, passing through the drying chamber, and such flue having made the desired circuit in the drying chamber, returns and passes through the kiln in contact with the furnace, so as to be highly heated. Openings, regulated by dampers, are left in the return flue within the drying chamber, by which the moist air is withdrawn, and the openings are left in the return flue, where it comes in contact with the furnace or fire-place, by which the flames of the furnace enter the return flue and ignite the gases and products of combustion as they pass away to the chimney. The drawing shows this system as applied to an arrangement of four kilns with drying rooms common to each kiln.

413. Patent Improved Method of Drying Malt, Hops, and other Produce; J. C. Plomley, Maidstone.

The improvement consists in introducing currents of heated air to pass over the surface of the produce to be dried, in addition to the ordinary method of passing heat through the produce. This causes a partial vacuum, by which rapid evaporation takes place at a low temperature, and carries off quickly the moisture arising from the ordinary drying fires. A in the drawing shows the roof; B the perforated drying floor; C a partition or flue, between which and the external wall, D, is placed, in addition to the central fire or fires, E, a side fire, F, one or more; G the cowl. The action of the whole is as follows:—The moisture arising (from the produce to be dried) by the action of the central fire E is immediately carried off by the current of heated air arising from the side fire, F, passing up the flue, C.

414. Patent Improvements in Refrigerators; W. P. Wilkins, Ipswich.

These improvements afford easy access for internal inspection or repair. The tubes, being without bends, may be seen through, simply by removing the two flat ends. Free expansion and contraction are allowed for by india-rubber joints, which also allow the easy removal of a tube without disturbing the others. The flushing cock, merely by being turned, admits of a strong current of water to remove any impurities, allowing the refrigerator to be used for a long time without being opened.

15. Machine for Preparing and Treating Jute, Hemp, Flax, and other Fibrous materials; Charles Bell Blyth, Dundee.

Fibrous materials, such as jute, hemp, flax, &c., require preliminary treatment known as "softening," and this machine is designed for the purpose, and consists in arranging three or four rows, tiers, or series of rollers mounted in the same framing, and driven by means of gearing. The material to be treated is fed into and between two rows of rollers, say the bottom and middle set of rollers, where three rows or sets of rollers are employed, and it is returned back again between the middle and top row or set of rollers, by means of a return feeder, which carries the material from between the first set or rows up to or between the next set or rows. Heating pipes are carried under and through the machine framing for aiding the process of softening.

416. Patent Washing, Steam-drying, and Wringing Machines, for flax, hemp, and other fibres, textile fabrics, &c.; J. J. Cregeen, M.D., F.R.C.P., Plough-road, Rotherhithe, S.E., and J. H. Dickson.

In these machines the undulating principle is applied to the cylinders, which, fitting into each other's surface, afford a much larger surface of contact, and do not let the material slip when wet, as is often the case with the round ones.

417. Patent Breaking Machine, for flax, hemp, and similar fibrous plants; J. J. Cregeen, M.D., F.R.C.P., and J. H. Dickson.

This machine consists of a central drum, having an undulating surface, toothed, which drum, when revolving, causes a beating action from smaller drums by which it is surrounded. The teeth are molar and canine, large and small, so as to change the position of the fibre on their surface. This apparatus may be propelled by any power, and is self-feeding.

418. Patent Scutching, Scraping and Brushing Machine for Flax, Hemp, and similar Fibrous Plants; J. J. Cregreen, M.D., F.R.C.P., and J. H. Dickson.

This machine is self-feeding, treble beating, scraping and brushing combined, and by means of its direct action will scutch fibre of almost any length. The tow, by being cleared of the shives before its separation from the fibre, is as valuable as the long fibre itself, that from many of the East and West India fibres, being almost as fine as silk. Waste is thus prevented.

419. Patent Yarn Winding Machine; Robertson and Orchar, Wallace Foundry, Dundee. W. and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

A frictional disc connection between the driving shaft and the winding spindles serves to secure an unvarying take-up velocity to the filling bobbins as they wind on. With this arrangement, the rotary speed of each spindle depends upon the distance from the centre of its disc, and of the point of contact of the disc on the horizontal shaft, and this can be varied by the lateral movement of the spindle.

420. Improved Grease Cup; J. Evans, Iron Steam-Boat Company's Works, Nine Elms, S.

The improvement in this cup consists in admitting the tallow, &c., direct on to the slide, instead of the old method of letting it in through the cylinder cover.

421. Patent Blocking Machine; John Samwells, Dunstable.

This machine is for blocking straw hats and bonnets, and is heated by steam.

422. Patent Wood-cutting Machinery for Irregular Forms; Arthur Kinder, Worcester. W. and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

This machine consists of a peculiar arrangement of cutter-head and mode of fixing the cutters therein; such cutters being either applicable for plain or moulded surfaces—the cutter being made to correspond to the form of moulding to be produced. The cutter-head consists of a solid cylinder, slotted down the centre, and the cutters are fixed inside the slots by screws or pins, such screws or pins passing through the cutters into back plates which direct the shavings away; or a conical plug may be used, forced between the back plates. The mouth of the cutter, when one is used, may be formed by fitting a pillar in front of each cutter at a suitable distance therefrom. This cutter-head is carried by a vertical spindle, having a vertical adjustment in any convenient manner. For working on surfaces which have been previously rounded, an adjustable flexible curved table-top is employed. This table, with the flexible top removed for plain work, is made to turn on centres, so as to be adjustable at any desired angle for the pupose of cutting bevelled work. A longitudinal traversing motion is imparted to the cutting table, in conjunction with a transverse traversing motion imparted to the wood to be cut; such motion being effected either by hand or by mechanical means. A simple arrangement of slots is employed for guiding the wood and its pattern or template across the table. In applying a portion of these improvements to vertical saw frames, the wood to be cut is fitted in slots or on slides in a circular table, which is free to be tilted or adjusted angularly whilst it revolves round the saw. The saw passes through the centre of the table, and the table itself is capable of revolving round the saw.

423. Balestrini's Telegraphic Cables; Perreaux and Co., Mark-lane, E.C.

In the drawings, Fig. 1 shows a side view and section of the core of a cable intended to be immersed at a slight depth, the covered wires forming the core being laid parallel to each other; but when the cable is intended to be immersed at a great depth, the covered wires are wound spirally around a small cord or curved wire, as seen at Fig. 2, or around an iron wire covered with hemp or other fibre, as seen at Fig. 3. These cores are then surrounded with hemp or other fibre, rendered waterproof, as seen at Fig. 4, where the core has twisted around it eight cords, each composed of four strands. The cable thus made is then passed between grooved rollers, so as to compress the cords around the core, and so as to prevent it from stretching when being laid down. The twisted cords are rendered waterproof by saturating them with a mixture of raw caoutchouc and pitch. The cable is stretched and bound round closely with iron wire, strips of zinc being placed horizontally between the coating of wire and the cable, which gives rise to a chemical and electrical action, keeping the outside coating from rust, and producing a calcareous deposit, by which it is much protected. If the cable is to be immersed to a considerable depth, long open spirals of iron wire are placed between the cable and its covering of galvanised wire, as seen at Fig. 5, the spirals running in the opposite direction to the coils of the cord. The iron wire composing these spirals not being galvanised, the same action takes place between galvanised and non-galvanised wire, which preserves the cable until the calcareous deposit is produced. In places where the cable is likely to come in contact with rocks, it is protected by having steel wire wound round it. Figs. 6, 7, and 8 show the parachute employed for facilitating the laying of the cable. In certain cases, when the parachutes would not be suitable, floats, filled with any substance soluble in water, may be substituted. (See specimens, No. 159.)

424. Instrument for Drawing Volutes; T. E. Merritt, Rochester.

This instrument consists of a heavy base of iron A, B, C, as shown in the drawing, to which is clamped a metal wheel D. The axis E passes through this wheel, and its handle end turns in the standard B. To the lower end of the axis there is a short bar of brass soldered, F, which terminates in a slotted guide, G. This piece of brass is bored throughout, and is fitted with a hollow tube, which is in one piece with the jaw, H, in which the running wheel, I, turns. The tube can be set to any position by the set-screw working through the brass piece. The running wheel, I, is tapped through its centre to serve as a running nut to the screw, K. This screw has a sliding block attached to the farther end which runs in the slotted guide, G, and carries a pencil below. When the handle is turned the running wheel, I, (which is edged with india-rubber) revolves by its friction against the fixed wheel, D, and thereby causes the screw to move outwards, and to bring the pencil away from the centre towards the circumference of the volute to be drawn. It will be seen that the interval between the lines depends on the distance of the wheel, I, from the centre of the fixed wheel, D; the nearer to the centre of D, the smaller the spaces. The diameter of the volute is equal to the diameter of the fixed wheel.

425. Patent Ringing Machine for Chiming Church and other Bells; W. Jones, Pendleton, near Manchester.

This machine is constructed of iron cog wheels, cam lifts, and levers, the cams pressing down the levers, and in their turn raising the clappers which strike the bells. The wheel at the end changes the peal, which is done by raising the catch and turning the wheel round one third, each horizontal shaft having a different peal or chime. The machine is complete in itself, and stands in a space of 3ft. by 2ft. 6in., and is put in motion by turning the handle.

426. New Artificial Foot, for Chopart's Operation; Kenneth H. Cornish, 5, Essex-court, Middle-temple, E.C.

This instrument restores the elastic arch of the foot, and enables persons who have had the front part removed to walk with a springy tread, at the same time preventing all chance of pain from pressure on the front of the stump. A metal socket is accurately moulded round the stump, especially where the ankle joints project, the front part only being left uncovered; from this a solid metal heel projects backwards, while from beneath the sole (which is slanted upwards) five strong springs, so curved as to complete the arch as in the natural foot, pass forward; five weaker springs, impinging against a metal arch, the extremities of which do not press on the front of the stump. A stuffing of cotton wool and a covering of leather allow the shape of the natural foot to be imitated, without interfering with the action of the springs. A stout sheet of india-rubber must be placed between the springs and the leather at the sole, to prevent the latter from being cut through by friction. The apparatus simply requires a strap to fix it, and only weighs from 12 to 24 oz. The drawing represents—1, a lateral view of the uncovered instrument; 2, ditto with the stump secured; 3, the appearance of the foot when completed.

427. New Artificial Leg; Kenneth H. Cornish.

This leg is constructed on somewhat similar principles to those shown in the foot. The pin is shifted more forward into the position occupied by the principal bone in the human leg, and rests upon an elastic arch composed of five springs for the front pier or toes, and two for the posterior pier or heel. A stuffing of wool, and a covering of leather or canvass, complete the apparatus. A leg for a working man can be made for less than a pound more than is charged for the old pin leg which is compared with it in the drawing. (See *Lancet*, October 21, 1857.)

428. New Artificial Foot; Kenneth H. Cornish.

The drawing is from a photograph of the skeleton of an apparatus made for a girl aged 13, who had the front of the foot removed five years previously, and was unable to walk from the intense pain created by pressure on the front of the stump. Arrest of development followed, and shortening to the extent of 3¼ inches. The case being one of extreme difficulty, a leather bucket was accurately moulded to the stump, and lined with soft leather. A metal cup at the bottom of this was attached to a block of wood, and the seven springs were secured in the grooves, where they rested in the wood by a thin plate of hammered steel. No iron sidebars were used, it being found that the two straps represented kept the apparatus firmly and comfortably fixed. As each spring is distinct in these several inventions, any single one which may be broken by accident, &c., can be replaced with ease. (Vide. Trans. Med. Society, London, in *Lancet*, 1858-59).

429. Vapour Bath for Local or General Fumigation with the Vapour of Calomel or other Drug; Kenneth H. Cornish.

This apparatus consists of a gourd-shaped, wide-mouthed vase of very thin glass, to the neck of which a linen tube is attached, a spirit lamp, and a wire stand. The drug to be volatilized is placed in the jar, which is then submitted to the action of the spirit lamp. When used locally, the finger, or other part upon which it is desired to act by the vapour, is plunged within, or held at the mouth of the jar, and the escape of the vapour prevented, by holding the linen tubing (previously dipped in oil) closely to the surface of the skin. When an ordinary vapour bath is to be given, the jar should be used without any tubing, the patient sitting on a chair over the apparatus, and beneath a thick blanket. (See the *Illustrated Inventor*, April 17th, 1858.)

430. Patent Sculling Propeller; John Buchanan, Greenock. W. and J. H Johnson, 47, Lincoln's Inn-fields, W.C., and Glasgow.

431. Submarine Screw Ship; George Cheek, Boston, Lincolnshire.

432. Lee's Water Tank and Life and Treasure Buoy; Lansing, Star, and Co.

See Model, No. 130.

433. Balestrini's Electric Sound; Perreaux and Co., Mark-lane, E.C.

See Model, No. 136.

434. Portable Iron Huts for Soldiers' Encampments, &c.; C. T. Guthrie, Clarence-place, Dover.

These huts are designed principally with a view to cheapness, lightness, portability, durability, and rapidity and ease of erection and removal, with due regard to comfort. The hut (Fig. 1) is formed of flat galvanized iron plates about 1-20th of an inch thick, secured together at the edges as represented in details A. B. No plate weighs more than 20lbs. The floor is formed of corrugated iron plates, with the edges turned down at right angles, and resting upon flat iron sleepers. The windows have thin cast-iron circular rims covered with vulcanized india-rubber bands, and are simply pressed into the holes in the plates. There is a stove provided with a telescopic chimney attached to a conical ventilator at the apex of the hut. The ventilator can be lifted or depressed by simply turning a handle (see section). In building the hut, the floor and walls should be first erected, the conical roof should then be put together independently and lifted into position (it weighs about 3 cwt.). The various parts of the hut are so contrived that they can all be packed in a small box, the sides and top and bottom of the box forming tables and benches for the men when the hut is erected. Fig. 2 represents another design. Here it must be noticed the plates are perfectly flat when disunited; but, as well as the angle pieces, are sufficiently thin to allow of their being bent as represented in the sketch.

435. Rowley's Patent Turnip Duster and Fly Destroyer; Priest and Woolnough, Kingston-on-Thames, S.W.

The object of this invention is to throw lime, soot, and other composition upon young turnip plants, to protect them from the ravages of the fly and other insects that infest them. The composition is dusted on to the plants by means of a powerful artificial wind, produced by revolving fans, which are put in motion by the travelling wheels of the machine.

436. Gas-Regulating Valves; Cockey and Sons, Frome, Somerset; W. and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

437. Sanitary Gas Stove and Standard for Gas Light; R. W. Giblett; F.W. Campin, 156, Strand, W.C.

By the arrangements here proposed the necessity for ordinary smoke or foul air funnels to gas stoves is stated to be dispensed with. A short funnel, which forms a pillar or standard for a gas light for lighting being substituted, the effect of the light at the top of this short funnel being to induce the smoke and foul products of combustion to pass to the top of the room, whence they may be removed by proper top ventilation, the top of the gas light being made sufficiently high to carry the products of combustion above the heads of the persons in the room.

438. Ventilating Gas-Lamp for Drawing-rooms; T. C. Hine, Regent-street, Nottingham.

In this lamp the products of combustion are collected in a glass dome, and passed through a tube into the smoke-flue of the apartment. There is an arrangement of valves by which fresh air can be admitted, either heated or not, so as to either raise or lower the temperature as required.

439. Iron Stack Flues; C. J. Richardson, F.R.I.B.A., 9A, King-street, Whitehall, S.W.

In these drawings, it is proposed that the chimney stack should be reduced to half the usual size, the principle affording scope for improved design, and being at the same time a means of preventing down draught. There is a rain vase on the stack, which is stated to separate the blacks from the smoke.

440. Patent Steam Washing Machines; Thos. Wheeler & Co., Albion Works, Oxford.

Fig. 1 is a barrel placed diagonally on an axis, with clothes placed inside; its motion is throwing the clothes violently from one end of the barrel to the other. Figs. 2 and 3 show the hot water apparatus. Fig. 4 represents a washing machine placed on the top of a portable engine boiler. The clothes can be boiled after washing, and then wrung by passing them between two hollow metal rollers. At the same time clothes can be thoroughly dried by heat from the engine. This can be used to go from place to place as a portable washing machine. Fig. 5 is an elevation of fig. 4.

441. Patent Washing Machines; T. Wheeler & Co..

The drawing, fig. 10, shows a reciprocating motion, stated to save from 50 to 60 per cent in labour. Fig. 15 represents a rotary barrel; the clothes can be placed both inside and outside the barrel; as the barrel revolves, the levers cause the brushes to act on the clothes. Fig. 16: This machine will wash inside and outside the barrel, the same as fig. 15, the clothes being placed underneath the tapes outside the barrel, and smaller articles thrown inside the barrel. The rubbers float upwards by their own buoyancy. Fig. 18 represents a double rotary cylinder machine, with barrel similar to that in figs. 15 and 16, traversing round a tub. This machine is intended for very large establishments. Clothes may be placed both inside and outside each barrel, on the circle at the bottom of the tub. Fig. 20 is a machine fitted with brushes in connection with an endless net (as shown in fig. 12). The endless net passes gradually round the two rollers. Circular brushes brush the clothes as they pass in and out the water. Figs. 13 and 14 can also be used as a reciprocating motion with the endless band instead of circular brushes. (See models, Nos. 313, 314 and 315.)

442. Patent Improved Vertical Mangle; George Halkerston, Freuchie, Fife, N.B.

The mangle consists of a pair of vertical parallel standards, of cast-iron, held together transversely by horizontal tie-rods and stays. These binding details consists of bars of wood, interposed between the standards, so as to abut at their ends against the standards, and their tension rods of metal laid parallel with the wooden bars, and bolted at the ends through the standards. In this way, the framing is both trussed or stayed and tied together. The actual mangling details consist of a pair of wooden rollers, of large diameter; the upper one of of which has attached to it the ordinary taking-in cloth. The end journals of the lower roller—on which the pressure comes—rest in each case upon a pair of anti-friction disc wheels, the stud spindles of which run in bearings, carried by an adjustable block or saddle piece, let into an opening in the standard. The end journals of the upper roller run in vertically adjustable bearings, fitted into slots in the main standards above—the pressure upon the pair of rollers being regulated by a compound plate spring, the two ends of which bear upon the bearings or their holders, whilst the centre of the spring is pressed upon by a screwed stud-spindle, fitted with an adjusting hand wheel. One side of the mangle is furnished with a hinged folding table.

443. Self-acting Registering Cask Tilter; G. Bursill, Jun., 1, Belvedere-road, Lambeth, S.

This invention consists in the combination of a spring balance, with a stillion or cask supporter, the object being to facilitate the withdrawal of liquid from a cask without disturbing the sediment. It not only tilts the cask, but at the same time registers any quantity of liquid that may be withdrawn in pounds or pints, &c., as may be desired. Fig. 1 is a view of the tilting apparatus applied to a cask containing liquor, part of which has been withdrawn. Fig. 2 is a view of the tilter, the face of which is so marked as to register pints, &c., on one side, and pounds, &c., on the other. Fig. 3 is a view of tilter, with part of index removed to show spring at back, enclosed in a tube or barrel.

444. Patent Domestic Self-cleansing Cistern and Filter; James Rae.

(See Model No. 280.)

445. Patent Mechanical Street Sweeper; L. Tindall, Sherwood Foundry, Mansfield, Notts; W. and J. H. Johnson, 47, Lincoln's-inn-fields, W.C., and Glasgow.

446. Patent Capped Bottles and Jars; Pearce and Co., Bristol.

(See Specimen No. 350.)

447. Patent Self-supplying Portable Fountain; A. Galliard.

(See Specimen No. 343.)

448. Patent Hydrostatic Machine for Coffee, Tea, &c.; E. Loysell, A. Inst. C.E.

(See Specimen No. 342.)

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TUES. ......Medical and Chirurg 8½.
WED. ......London Inst., 12 a.m. Anniversary.
Royal Soc. Literature, 4½.
Society of Arts, 8. Mr. J. Arthur Phillips, "On the Metallurgy of Lead"
Archæological Assoc., 8½.
THURS .....Numismatic, 7.
London Inst., 7. Prof. Bentley, "On Vegetable Substances used for the Food of Man."
Philological, 8.
FRI. ......United Service Inst., 3. Major-Gen. Portlock, "On the advantage of cultivating the Natural and Experimental Sciences as promoting the Social Comfort and Practical Utility of Military Men."

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, April* 15, 1859.]

Dated 12*th March*, 1859.

636. J. Thornton, Liverpool—Imp. in machinery for the manufacture of bricks, tiles, and other similar articles.

Dated 16*th March*, 1859.

658. C. Parker, Dundee—Imp. in looms for weaving.
666. E. Anscombe, 95, Westbourn-street, Pimlico—An apparatus for taking an accurate delineation of any view or object in open air or otherwise.

Dated 17*th March*, 1859.

676. R. A. Brooman, 166, Fleet-street—Treating barley so as to obtain new alimentary substances therefrom. (A com.)